National Grid
1 MetroTech Center
Brooklyn, New York 11201

HEALTH AND SAFETY PLAN

PRE-DESIGN WORK PLAN ACTIVITIES
GOWANUS CANAL SUPERFUND SITE
BROOKLYN, NEW YORK

Prepared by

Project Number:

February 2014

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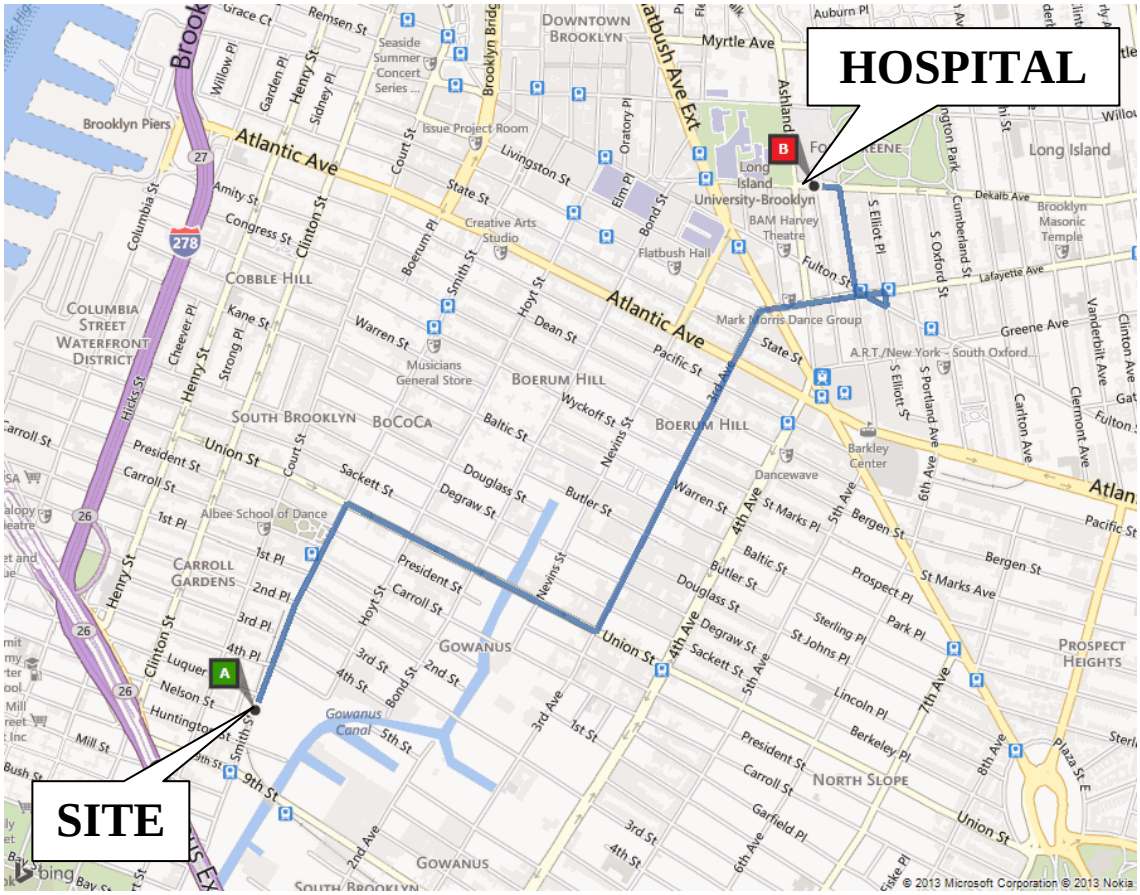
APPENDICES

EHS Incident Response Procedures Flowchart

[Consultant/Engineer to insert Company-specific flowchart]

ROUTE TO HOSPITAL



BROOKLYN HOSPITAL CENTER

(718) 250-8000

121 DeKalb Avenue.

Brooklyn, New York 11205

Directions to Hospital from the Site:

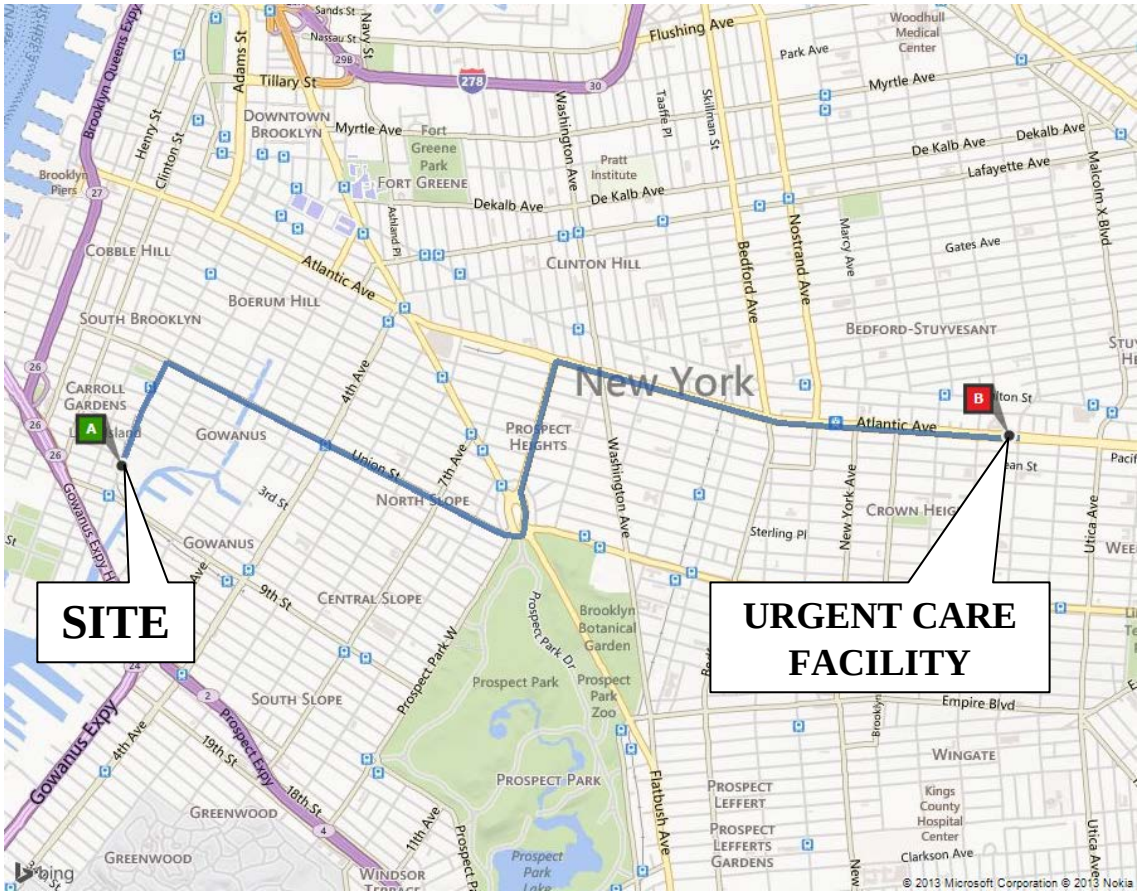
Starting at 455 Smith Street, Brooklyn, New York

1. Depart Smith Street toward Luquer Street (0.4 mi).
2. Turn right onto Union Street (0.5 mi).
3. Turn left onto 3rd Avenue (0.7 mi).
4. Keep straight onto Lafayette Avenue (0.2 mi).
5. Turn right onto South Elliot Place/South Elliott Street and then immediately turn right onto Fulton Street (482 ft).
6. Turn right onto Brooklyn Tech Place/Fort Greene Place (0.2 mi).
7. Turn left onto DeKalb Avenue (230 ft).
8. Arrive at 121 DeKalb Avenue, Brooklyn, New York 11201.

   The last intersection is Brooklyn Tech Place/Fort Greene Place.

   If you reach St. Fleix Street, you've gone too far.

ROUTE TO URGENT CARE FACILITY



INTERFAITH MEDICAL CENTER

(718) 613-4988

1545 Atlantic Avenue

Brooklyn, New York 11213

Directions to Urgent Care Facility from the Site:

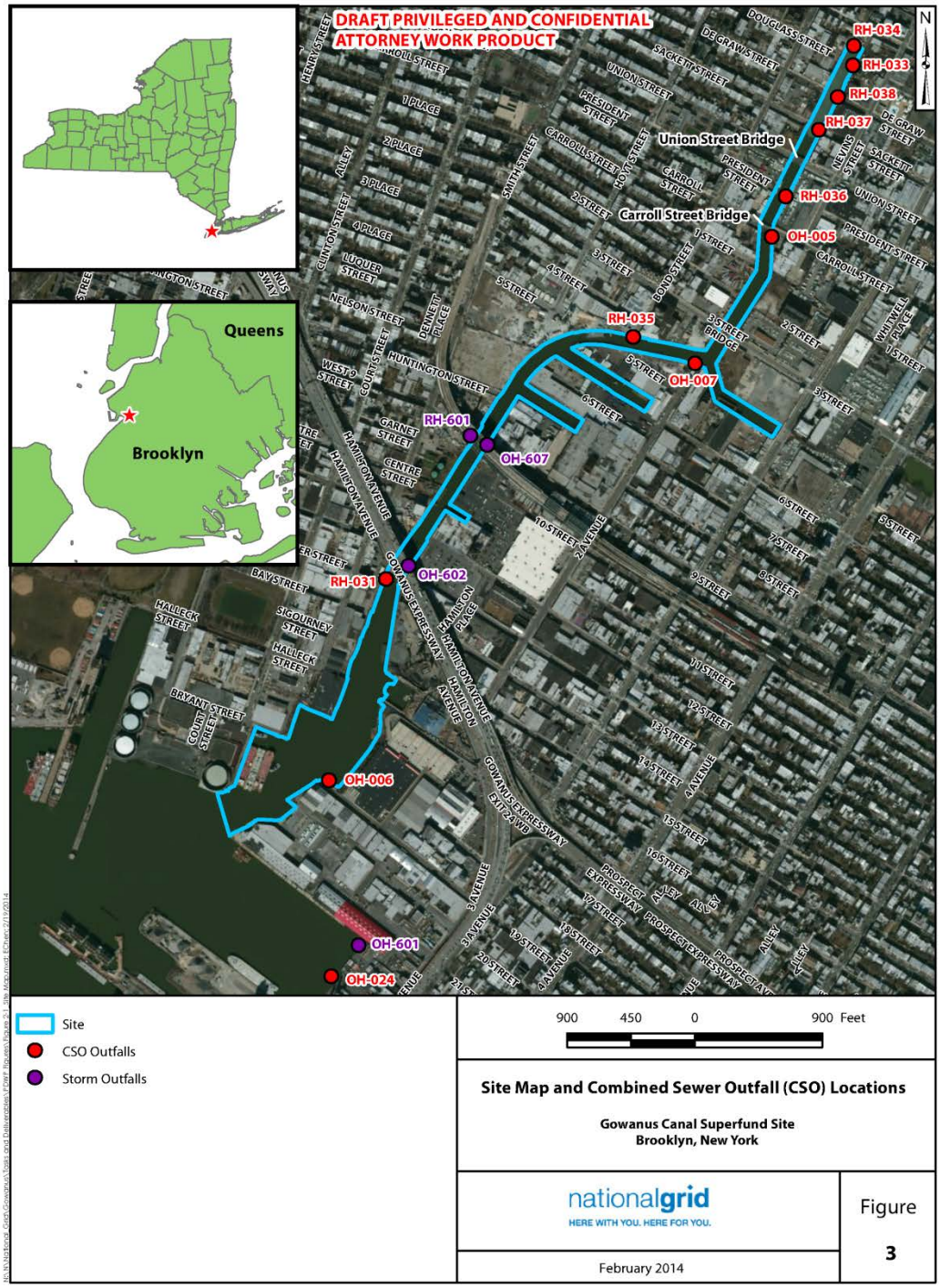
Starting at 455 Smith Street, Brooklyn, New York

1. Depart Smith Street toward Luquer Street (0.4 mi).
2. Turn right onto Union Street (1.4 mi).
3. Bear left onto Grand Army Plaza (16 ft).
4. Turn left to stay on Grand Army Plaza (0.1 mi).
5. Keep right onto Vanderbilt Avenue (0.5 mi).
6. Turn right onto Atlantic Avenue (McDonald's on the corner) (1.6 mi).
7. Keep right to stay on Atlantic Avenue (404 ft).
8. Make a U-turn at Troy Avenue (233 ft).
9. Arrive at 1545 Atlantic Avenue, Brooklyn, New York 11213 on the right.

   The last intersection is Troy Avenue.

   If you reach Albany Avenue, you've gone too far.

SITE MAP


DRAFT PRIVILEGED AND CONFIDENTIAL
ATTORNEY WORK PRODUCT
Queens
Brooklyn
RH-034
RH-033
RH-038
RH-037
RH-036
RH-035
RH-031
RH-601
OH-005
OH-007
OH-607
OH-602
OH-006
OH-601
OH-024
Union Street Bridge
Carroll Street Bridge
Site
CSO Outfalls
Storm Outfalls
900 450 0 900 Feet
Site Map and Combined Sewer Outfall (CSO) Locations
Gowanus Canal Superfund Site
Brooklyn, New York
nationalgrid
HERE WITH YOU. HERE FOR YOU.
Figure
3
February 2014

1. INTRODUCTION

This site-specific Health and Safety Plan (HASP) was prepared to address project-specific hazards known or suspected to be present associated with the existing conditions and work to be performed at the work site(s). This HASP was prepared to meet the requirements specified in Occupational Safety and Health (OSHA) Hazardous Waste Operations Emergency and Response (HAZWOPER) program, [Consultant/Engineer]'s Health and Safety (H&S) Procedures, and the H&S requirements of the client.

2. SIGNATURES

2.1 Preparers and Reviewers

This HASP must be maintained onsite when field work is being performed. The Site Health and Safety Officer (SHSO) can change or amend this document, in agreement with the Health and Safety Coordinator (HSC) and Project Manager (PM). Amendments (e.g., changes in personal protective equipment, addition of tasks, etc.) must be documented in Section 19 and in Appendix A. This HASP must be reviewed and amended on an annual basis for projects if field activities extend beyond one year.

Prepared by:

_____

SHSO Date

Reviewed by:

_____

HSC Date

Approved by:

_____

Project Manager Date

This HASP has been given to the following H&S approved subcontractor(s).

Subcontractor:		Representative:		Date:	
Subcontractor:		Representative:		Date:	
Subcontractor:		Representative:		Date:	

2.2 Site Workers

This HASP must be reviewed by personnel prior to Site work. Workers not in attendance at the initial meeting must be trained by the SHSO on the information covered in the pre-entry briefing. After reading the HASP and attending a pre-entry briefing, [Consultant/Engineer] employees and other parties covered under this HASP must sign the following acknowledgment statement.

"I have read, understand, and will perform my work in accordance with the information set forth in this HASP."

Signature	Printed Name	Date

3. EMERGENCY CONTACT INFORMATION

Contact	*Telephone Numbers*	
	Office	*Alternate (Type)*
Fire Department		
Police Department		
Site Emergency Response (if applicable)		
Hospital -		
Director of H&S -		
H&S Regional Manager -		
Project Manager -		
Site Health & Safety Officer -		
H&S Coordinator -		
Principal- or Associate-in-Charge -		
Utility Emergencies	811	
Occupational Health Care Provider -		
Facility Contact -		
Client Contact -		
Subcontractor -		
Subcontractor -		
Other -		

4. APPLICABILITY OF THIS HASP

This HASP was prepared in accordance with [Consultant/Engineer]'s H&S Procedures for use by [Consultant/Engineer]'s project staff and subcontractors. Subcontractors, at minimum, shall ensure that their employees, and those of their lower tier subcontractors, comply with these procedures and other health, safety and security provisions in the Subcontract. Subcontractors shall be responsible for examining all stated requirements within this HASP, determining if additional or more stringent health, safety, and security provisions are appropriate for their portion of the work, and implementing any modifications accordingly. This document and its contents should not be used prior to review by the health and safety managers of any group or individual performing any work at this Site.

5. SITE/TASK/HAZARD DESCRIPTION

5.1 Site Background

The following is a brief description of the Site, its location, approximate size, previous usage, and current usage. A description of the tasks to be performed is also presented.

- Site Location: Brooklyn, New York
- Approximate Size of Site: 1.8-mile-long, man-made canal
- Previous Site Usage: Conveyance channel for barges. Conveyance channel for sewage and industrial wastes.
- Current Site Usage: Conveyance channel for barges. Conveyance channel for combined sewer overflows (CSOs).
- Description of Surrounding Property/Population:

North	Boerum Hill neighborhood	East	Park Slope neighborhood
South	Gowanus Bay	West	Carroll Gardens and Red Hook neighborhoods

- Summary of previous site investigations:

Since 1983, the NYC Department of Environmental Protection (NYCDEP) has compiled four separate reports on water quality and CSO controls for the Canal, each of which was approved by the New York State Department of Environmental Conservation (NYSDEC) for proposed further actions. Since 2003, the United States Army Corps of Engineers (USACE) has issued about a dozen reports regarding the Canal. National Grid has completed numerous reports regarding its former MGP sites, and studies and/or cleanups have been conducted at another dozen or more upland areas.

In April 2009, the Gowanus Canal was proposed for inclusion on the National Priorities List (NPL) pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at the request of NYSDEC. EPA commenced a remedial investigation (RI) following the proposal for inclusion on the NPL, and on March 2, 2010, EPA placed the Canal on the NPL.

In April 2010, EPA entered into Administrative Orders of Consent with NYC and National Grid to perform work in support of EPA's remedial investigation/feasibility study (RI/FS). The RI Report was completed in January 2011 and the draft FS Report was completed in December 2011. An FS addendum report was completed in December 2012.

5.2 Task Descriptions

Task 1: PD-3: Additional Reconnaissance for Debris Removal

The overall objective of this work element is to identify and characterize debris present in the areas not included in the high-frequency side-scan sonar study completed in December 2010. If needed, areas of uncertainty in the previous survey will be revisited for confirmation. This additional debris reconnaissance builds upon information contained in the RI for the Site. Information from this work element will assist in refining and improving the comprehensive Site-wide CSM and prepare for future remedial activities.

The results of PD-3, coupled with previous work, will be used to develop the plan for PD-4: A Plan for Debris Removal, Decontamination, and Disposal. The work element will also provide information to support design components related to equipment mobilization, staging and project infrastructure needs, and logistics.

Task 2: PD-4: A Plan for Debris Removal, Decontamination, and Disposal

The overall objective of this work element is to develop a Debris Removal, Decontamination, and Disposal Plan to govern the removal and/or management of debris such that the underlying targeted sediment can be efficiently and effectively dredged and/or remediated.

Key components of the Debris Plan will include but not limited to:

- Debris removal;
- Debris decontamination;
- Debris handling and disposal; and
- Cultural resources management.

The results of PD-4 will be used specifically to develop the remedial design component associated with debris management. The work element will also provide information to support design components related to sediment dredging, dredge material management, transport off-Site, dewatering and water treatment, and archeological methodologies to address cultural resources in debris removal and dredging.

Task 3: PD-5: Detailed Survey and Assessment of Existing Bulkheads for Remedy Implementation

The overall objectives of the bulkhead survey and assessment work element are to provide a plan for performing a preliminary assessment of the stability of existing bulkheads during and after remedy implementation, and to create a preliminary design of bulkhead support systems. The proposed field exploration program will collect data to be used as the basis for design of bulkhead support systems. It is anticipated that supplemental information will be required for the design of property-specific support systems.

The activities that are planned as part of PD-5 include:

- Subsurface investigation of existing bulkhead foundations;
- Geotechnical site investigation;
- Factual bulkhead investigation report;
- Evaluation of existing bulkhead stability during remedy implementation;
- Evaluation of final conditions for bulkheads; and
- Assessment and recommendation of existing bulkhead report.

The results of PD-5, coupled with previous work, will be used to develop the bulkhead stabilization design components. The work element will also provide information to support design components related to capping, amendment layer design, ISS, and archeological methodology.

Task 4: PD-6: A Plan for Staging Site Selection and Implementation Plan

This work element has been prepared to describe the approach and methods to be used to select sites for the staging activities necessary to assemble and transfer labor, equipment, supplies, and material during remedial activities. The objective of this work element is to develop a plan describing the means to:

- Identify project infrastructure needs;
- Determine necessary staging site requirements;
- Identify potential staging sites; and,
- Evaluate staging sites.

It is anticipated that candidate sites will be re-evaluated throughout the design process as project infrastructure needs are refined. The results of PD-6 will be used to develop several design components, including equipment mobilization, staging, sediment handling, transport off-site, dewatering and water treatment, and logistics. The work element will also provide information to support the design component related material procurement.

Task 5: PD-7: Evaluation of Potential Groundwater Upwelling Areas and Measurement of Discharge Rates

Two primary objectives of this work element are to determine the approximate areas of significant groundwater upwelling in the Gowanus Canal and, for those areas where discharge is identified, to estimate the rate and velocity of this discharge.

The activities that are planned as part of PD-7 include:

- Evaluate and select applicable technologies for locating groundwater discharge areas and quantifying discharge rates;
- Evaluate and select areas of the Canal for groundwater upwelling measurements;
- Inspect Site to confirm feasibility of selected technologies at target locations;
- Implement selected technologies to assess groundwater upwelling areas and discharge rates;
- Characterize the hydraulic conductivity between the native and soft sediments;
- Refine the groundwater CSM and groundwater model; and
- Data management, analysis, and reporting.

The results of PD-7, coupled with previous work, will be used to develop the design elements related to capping, the capping amendment layer, ISS, and bulkheads. The work element will also provide information to support design components related to material procurement.

Task 6: PD-8: Evaluation of Potentially Mobile NAPL in Native Sediments

The primary objectives of this work element are to (i) quantify the coal tar NAPL distribution within the canal, (ii) define areas of potentially mobile NAPL, and (iii) identify and characterize the controlling factors of NAPL mobility.

The activities that are planned as part of PD-8 include:

- Desktop evaluation of NAPL mobility and selection of appropriate fieldscreening technology(ies) and assessment locations;
- Implementation of field-based approaches to assess in situ NAPL distribution;
- Laboratory mobility testing and NAPL characterization; and,
- Data management, analysis, and reporting.

The results of PD-8, coupled with previous work, will be used to develop the design component for ISS. The work element will also provide information to support design components related to bulkhead stabilization, capping, and material procurement.

Task 7: PD-9: Additional Sampling for Polychlorinated Biphenyls (PCBs)

Mitigation of ongoing PCB sources will be a key component of a sustainable remedial design. Additional sampling is needed in areas with elevated PCB concentrations to determine if there are upland PCB sources that require controls. Hydrodynamic and sediment modeling will also be used to provide an additional line of evidence of upland PCB sources. The additional sampling data will also support the waste disposal component.

Task 8: PD-10: Stabilized Material Use and Treatability Testing

The ROD referenced the potential beneficial reuse of dredged material as landfill cover. This option will be evaluated during treatability testing to determine the optimal amount of stabilization agents (e.g., pozzolonics) needed in order for the amended dredged material to reliably meet the acceptance criteria of a permitted end-use/disposal site such as a landfill or similar facility.

Task 9: PD-11: Study of Canal Operations

A detailed evaluation of vessel operations in the Canal will be undertaken to refine sizing needs of the cap armoring layer in different RTAs. The conceptual layout of the armor layer provided in the FS did not include the influences of twin propellers and rudders which could result in larger bottom velocities and the need for larger armor layers. The refined understanding of vessel operations and armor layer needs will be incorporated into PD-24: Propeller Wash and Cap Armoring Study and will directly support cap design.

Task 10: PD-12: Groundwater Model Update

Estimates of groundwater upwelling (discharge) in the Canal using the existing numerical groundwater model are based on a calibration to various inputs, including measured hydraulic conductivity of subsurface formations outside the Canal, measured groundwater elevations outside the Canal, and mean sea level in the Canal. The model's simulation of sediments within the Canal is approximated using fitted sediment hydraulic conductivity estimates. New data to be collected as part of PD-7: Evaluation of Potential Groundwater Upwelling Areas and PD-8: Evaluation of Potentially Mobile NAPL in Native Sediments will include identification of groundwater discharge areas, quantification of discharge rates in selected areas, lithology descriptions, and possibly hydraulic conductivity values for the soft sediment and native sediments. Incorporation of these data into the groundwater model followed by a recalibration to match groundwater discharge rates (if necessary) will refine the model and enable it to be used for predictive assessment of NAPL mobility as well as potential groundwater gradients and elevations due to implementation of bulkhead stabilization, ISS, and capping.

Task 11: PD-13: Upland Area Evaluation for Cut-off Walls

A land-side survey will be conducted along the Canal side-walls to identify upland locations requiring cut-off walls or other remedial measures due to NAPL that has migrated to upland locations. Follow-up investigations to evaluate the extent (depth, length) of the cut-off walls will be conducted. Mitigation of ongoing NAPL sources will be a key component of a sustainable remedial design.

Task 12: PD-14: Compliance Plan for Federal and State Archeological Requirements

A plan will be developed to comply with applicable Federal and State archeological requirements. The plan will be referenced in the remedial design for sediment and debris removal.

Task 13: PD-15: Laboratory Evaluation of NAPL Mobility

Additional laboratory evaluations will be conducted to assess the potential mobility of NAPL under in situ conditions. This work element will build upon and expand the bench-scale work completed by EPA and will complement PD-8: Evaluation of Potentially Mobile NAPL in Native Sediments. An expanded number of tests to provide more representative data and confirmation of results are needed to support ISS boundary delineation. The work element addresses a CSM data gap and is directly related to ISS and capping design components.

Task 14: PD-16: Revisions to Sediment and Hydrodynamic Models

Sediment and hydrodynamic models will be revised to incorporate recently collected sediment and water data. The model updates are of particular importance as they relate to of activation of the Flushing Tunnel. This work element will include updating the models based on recent data collection and refinement of the model grid or other features to ensure they are well suited for remedial design needs. The models will be used to evaluate the Flushing Tunnel impacts as well and can be used to inform the remedial design.

Task 15: PD-17: Evaluation of Active Cap Treatment Technologies

Laboratory evaluation of active cap treatment technologies is needed to screen and validate potential amendments and amendment mixes to address contaminants that are present and mobile in the sediment matrix. Amendments will be evaluated under scenarios representative of in situ conditions in different RTAs to collect data on design parameters (e.g., sorption potential). Results will be incorporated directly into the remedial design for capping.

Task 16: PD-18: Geotechnical Characterization for Cap Design

Additional field characterization of geotechnical parameters to support cap design will be conducted to improve data density in several areas and to further refine understanding of cap stability, consolidation, and strength gain over time. Additional testing will be conducted to assess the potential to accommodate potentially larger armor layer diameters as a result of a refined understanding of armor layer needs from PD-11: Study of Canal Operations. The results will directly support cap design over both soft and native sediments.

Task 17: PD-19: Laboratory Evaluation of ISS Performance

Additional laboratory studies will be conducted to evaluate and optimize the performance of materials and mixture ratios for the ISS design. This work element will build upon the bench-scale work completed by EPA and will expand the number of tests to provide more representative data and confirmation of results. The work element directly supports ISS and capping remedial design components, including providing information to help optimize mix design and determining the appropriate remedy (capping or ISS) in various areas of the canal.

Task 18: PD-20: Technical Workshops

Periodic technical workshops with EPA will be conducted to develop agreement on predesign task scoping and share results in an expedited and direct manner. Periodic in-person meetings will be augmented with teleconference and videoconference meetings as the need arises. The technical workshops with EPA are intended to be mutually beneficial and maintain a productive remedial design schedule.

Task 19: PD-21: Sediment Stabilization and Treatment Technologies Treatability Studies

Laboratory treatability studies of sediment stabilization and treatment technologies will be conducted to evaluate various approaches to optimize sediment dewatering and to identify material-specific pozzolonic mixing ratios to optimize the binding of the contaminants into a stable matrix. From these stabilization and treatability studies, the laboratory mixtures will be subjected to leachability studies to determine compliance with acceptability criteria at various disposal and/or permitted end-use facilities. Cost and performance data will be developed to screen approaches and support dredging design.

Task 20: PD-22: Bathymetric Survey after Flushing Tunnel Operation

A bathymetric survey will be conducted after the Flushing Tunnel activation to assess sediment transport as a result of increased flow velocities and the potential need for sediment chemical of potential concern (COPC) re-characterization. Results from the bathymetric survey will be incorporated into sediment and hydrodynamic model updates planned as part of PD-16, to ensure the models are relevant and accurate for remedial design activities, including dredge and cap design.

Task 21: PD-23: Dredge Volume Field Study

A refined dredge volume field study will be conducted to confirm the bathymetric survey and native sediment elevations. Results from the field study will be used to refine and confirm sediment and hydrodynamic model updates and finalize dredge and cap design, including dredge prism delineation.

Task 22: PD-24: Propeller Wash and Cap Armoring Study

Evidence of vessel disturbance on the sediment bed is apparent in the high resolution multi-beam bathymetric surveys performed in 2010 and 2011, and needs to be accounted for in the design. A refined propeller wash and cap armoring study will be conducted after Flushing Tunnel operation. Hydrodynamic and sediment transport models will be used to evaluate impacts of propeller wash. Detailed assessment of flow velocities induced by propeller wash, as predicted by the modeling, will be quantified and incorporated into the cap armor layer design.

Task 23: PD-25: CSM Refinement

The Site-wide comprehensive CSM must be refined so that the remedial design can account for all physical and chemical Site processes that have bearing on remedial effectiveness. Results of the pre-design investigations and post-Flushing Tunnel activation studies will be integrated into the CSM to guide remedial design needs and enable predictive modeling of remedial actions.

Task 24: PD-26: Basis of Design Report

The basis of design (BOD) is an integral step in the planning, scoping, and execution of the technical studies and engineering design required to develop a comprehensive remedial approach for contaminated sediments in the Gowanus Canal. The BOD will also be used to develop the project schedule and budget requirements. The BOD is a "living document" that is initiated at the beginning of the design effort and develops the design principals. The final BOD is completed later in the project, once the final design is completed, and synthesizes all project information, including defining and detailing the remedial approach and associated remedial design parameters that are developed, tested, and agreed to during the remedial design.

Task Hazard Analyses (THAs) associated with these tasks are presented in Appendix B.

5.3 Chemical Hazards

The classes of chemicals that are known or suspected to be present that may be encountered while performing Site work include the following:

- Petroleum hydrocarbons, including benzene, toluene, ethylbenzene, xylenes (BTEX)
- Polycyclic aromatic hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs)
- Hydrogen sulfide
- Hazardous metals

Controls for these hazards are presented in the THAs included in Appendix B. A summary of these chemical hazards is presented in Appendix C.

5.4 Physical Hazards

The following physical hazards have been identified associated with the work to be performed and the Site conditions.

- Boating
- Cold Stress
- Compressed Gases
- Drilling (including Indoor)
- Drum and Container Handling
- Electrocution
- Eye Injury
- Flash Flood

- Hand/Foot Injury
- Heat Stress
- Heavy Equipment
- Knives/Blades
- Lifting Heavy Loads
- Loud Noise/Vibration
- Portable Power/Hand Tool
- Slips, Trips, and Falls
- Severe Weather/Thunderstorms
- Thoroughfares/Traffic
- Urban Environments
- Utility Protection

Controls for these hazards are presented in the THAs included in Appendix B.

5.5 Biological Hazards

The following biological hazards have been identified associated with the work to be performed and the Site conditions.

- Biting/stinging insects
- Sewerage
- Waste water

Controls for these hazards are presented in the THAs included in Appendix B.

6. GENERAL SAFE WORK PRACTICES

The following general safe work practices must be adhered to while performing Site work:

- Level D (modified) personal protective equipment (PPE) shall be the default PPE to be worn during all field work performed on the Site. This will include hard hats, safety glasses, hard-toed boots, and high-visibility vests. If conditions allow, the requirement for hard hats and hard-toed boots may be reduced with approval of the SHSO and PM. Upgraded PPE will be used as Site conditions dictate (see Appendix D), or at the discretion of the SHSO and PM.
- Minimize contact with impacted materials. Do not place equipment on the ground. Do not sit or kneel on potentially contaminated surfaces.
- Smoking, eating, or drinking after entering the work zone and before personal decontamination is not allowed.
- Workers taking prescribed medication that may cause drowsiness shall not operate heavy equipment and are prohibited from performing tasks where Level C or B personal protective equipment is required. Employees who are suspected of being under the influence of illegal drugs or alcohol will be removed from the Site.
- Good housekeeping will be practiced to minimize physical and chemical hazards.
- Use of contact lenses is not allowed under certain hazardous working conditions.
- The following practices must be observed when operating a motor vehicle:
    - Use of seat belts is mandatory
    - Use of headlights is mandatory during periods of rain, fog, or other adverse weather or low-light conditions
    - A backup warning system or use of vehicle horn is mandatory when the vehicle is engaged in a backward motion
    - Posted traffic signs and directions from flagmen must be observed
    - Equipment and/or samples transported in vehicles must be secured from movement
    - The use of vehicles acquired by [Consultant/Engineer] by non-[Consultant/Engineer] personnel is prohibited
- In an unknown situation, always assume the worst reasonable conditions.
- Be observant of your immediate surroundings and the surroundings of others. It is a team effort to notice and warn of dangerous situations. Withdrawal from a hazardous situation to reassess procedures is the preferred course of action.
- Should unanticipated conflicts arise concerning safety requirements and working conditions, the SHSO and PM will provide rapid resolution of the situation to establish consistent safety policies.

- Unauthorized breaches of specified safety protocol are not allowed. Workers unwilling or unable to comply with established procedures will be asked to leave the work site.

7. EMERGENCY RESPONSE

This section discusses emergency response procedures and response equipment to be maintained on Site. A table presenting a list of contacts and telephone numbers for the applicable local and off-Site emergency responders is provided in Section 3 of this HASP.

7.1 Injury and Emergency Response Procedures

In the event of an **injury** to an employee, the instructions for injury response and reporting, located in the front of this HASP, must be implemented immediately. In the event that an **emergency** develops, the following procedures are to be implemented:

The Site Health and Safety Officer (SHSO), or designated alternate, should be immediately notified via the on-Site communication system. The SHSO assumes control of the emergency response.

- If applicable, the SHSO must immediately notify off-Site emergency responders (e.g., fire department, hospital, police department, etc.) and must inform the response team of the nature and location of the emergency on Site.
- If applicable, the SHSO may call for evacuation of the Site. Site workers should move to their respective refuge stations using the evacuation routes provided on the Site Map.
- For small fires, flames should be extinguished using the appropriate type of fire extinguisher. Large fires should be handled by the local fire department.
- If a worker is injured, the procedures presented in "Instructions for Injury Response", located in the front of this HASP, must be implemented immediately.
- After an incident has stabilized, the procedures presented in "Instructions for Incident Reporting", located in the front of this HASP, must be followed.

7.2 Emergency Response Equipment

Emergency response equipment will be maintained in the work area as necessary for this project. Examples of emergency response equipment include first aid kits, fire extinguishers (Type ABC), and eyewash bottles.

8. KEY PERSONNEL AND HEALTH AND SAFETY RESPONSIBILITIES

Project personnel and their responsibilities in regard to health and safety concerns on this project are as follows:

Project Manager (PM): [Insert name of PM here]

- Approve this HASP and amendments, if any;
- Monitor the field logbooks for health and safety work practices employed;
- Coordinate with SHSO so that emergency response procedures are implemented;
- Confirm that corrective actions are implemented;
- Confirm and document that qualified personnel receive this plan and are aware of its provisions and potential hazards associated with Site operations, and that they are instructed in safe work practices and familiar with emergency response procedures; and
- Provide appropriate monitoring, personal protective equipment, and decontamination materials.

Site Health and Safety Officer (SHSO): [Insert name of SHSO here]

- Prepare and implement project HASP and amendments, if any;
- Report to the Project Manager for action if deviations from the anticipated conditions exist and authorize the cessation of work if necessary;
- Confirm that Site personnel meet the training and medical requirements detailed in Section 9;
- Conduct pre-entry briefing and daily tailgate safety meetings;
- Ensure that general safety and first aid equipment (e.g. first-aid kits, fire extinguishers, AED, etc.) are available to Site staff and in working order;
- Confirm that monitoring equipment and personal protective equipment are operating correctly according to manufacturer's instructions and such equipment is utilized by on-Site personnel. Calibrate or check calibration of monitoring equipment and record results;
- Confirm that decontamination procedures are being implemented;
- Implement Site emergency response and follow-up procedures;
- Notify the HSC in the event an emergency occurs; and
- Perform and document weekly inspections.

Health and Safety Coordinator: [Insert name of HSC here]

- Review and audit HASP and amendments;
- Notify Director of Health & Safety when an emergency occurs;
- Assist with the implementation of the corporate health and safety program; and
- Consult with staff on health and safety issues.

Site Workers

- Provide verification of required health and safety training and medical surveillance prior to arriving at the Site;

- Notify supervisors of workplace accomodation requirements as the result of physical limitations or medical conditions;
- Attend pre-entry briefings and daily tailgate safety meetings;
- Immediately report accidents and/or unsafe conditions to the SHSO;
- Be familiar with and abide by the HASP; and
- Be ultimately responsible for his or her own safety.

9. WORKER TRAINING AND MEDICAL SURVEILLANCE

Personnel involved in field activities subject to OSHA HAZWOPER 29 CFR 1910.120 will be required to participate in both a health and safety training program that complies with criteria primarily set forth by the OSHA HAZWOPER in 29 CFR 1910.120(e) and a medical surveillance program covered under 29 CFR 1910.120(f), or equivalent regulations based on the jurisdiction in which the project is performed.

9.1 Pre-Assignment and Annual Refresher Training

Prior to arrival on-Site, the [Consultant/Engineer]'s SHSO will be responsible for confirming that their staff meet the requirements of pre-assignment training. In addition, personnel must be able to document dates of attendance at an annual 8-hour refresher and three days of fieldwork under a qualified supervisor. Failure to provide this documentation will prohibit entry to the active work area(s).

Additionally, any specialized training required to perform work at the Site (boating safety courses, equipment operation training, etc.) will be completed prior to arrival at the Site. Documentation of the completion of training will be provided to the SHSO.

9.2 Site Supervisor Training

Consistent with OSHA 29 CFR 1910.120 (e)(4), prior to arrival on Site, individuals designated as Site supervisors require an additional eight hours of specialized training. Documentation of this training will be provided to the SHSO.

9.3 Initial Site Safety Orientation and HASP Review

In addition to complying with 29 CFR 1910(e), Site personnel will attend an initial safety orientation during which the HASP and applicable THAs will be reviewed prior to initiating field activities. This review will include the following:

- Site personnel roles and responsibilities regarding health and safety;
- Specific hazards related to the Site and Site operations, including chemical and physical hazards;

- Training in the proper use, maintenance, and decontamination protocol of PPE and Level(s) of Protection;
- Appropriate work practices and engineering controls to reduce/eliminate exposures to Site hazards;
- Means for normal and emergency Site communication;
- Air monitoring strategies, including the frequency and types of air monitoring employed at the Site, action levels, sampling techniques, and pre/post calibration techniques;
- Unique/Site specific medical surveillance requirements that need to be considered based on Site hazards;
- Site control measures, work zones, and proper decontamination procedures for personnel/tools/vehicles, etc. to reduce the potential for both on- and off-Site contamination;
- Rapid, effective emergency response procedures; and
- Confirmation of specialized training for personnel involved in specific hazardous activities, such as confined space entry, drum handling, sampling unknowns, etc.

9.4 Baseline Medical Surveillance Exam

The baseline medical examination is used to identify physical capabilities and certain medical limitations that may have an impact on the candidate's ability to perform in the position and/or job activity for which he/she is being considered, as well as to establish certain baseline medical parameters. The initial test results can then be compared against future periodic or project-specific monitoring results.

9.5 Periodic/Annual/Biennial Medical Exam

The periodic medical examination is used to evaluate an employee's continued fitness for duty and to assess possible impact(s) occupational exposures may have had on their health status. The periodic examination includes an update to the medical and work history, results of previous occupational exposure assessments, and a detailed medical exam tailored to the job description.

The Medical Director from [Occupational Health Care Provider] determines the frequency of the periodic medical exams based on regulatory requirements, the position/work activities of the employee, and the level of exposure to physical, chemical, and biological agents.

9.6 Exposure/Activity/Project-Specific Medical Testing

Exposure-specific medical tests and/or evaluation of biological indices may be conducted to establish a baseline for certain project-specific parameters, to monitor the effectiveness of hazard controls, and/or to assess the impact of occupational exposures associated with a particular work activity or project. The Medical Director, in coordination with the EHS Department, will require

or recommend an exposure-specific exam when deemed appropriate based on knowledge of project hazards, occurance of employee health symptoms, or an unexpected exposure event. Requests for exposure-specific examinations will be forwarded to the EHS Department, who will process the requests in collaboration with the Medical Director. The Medical Director will determine the type and frequency of the exposure-specific medical exams for employees designated to participate based on sound medical practice, toxicology information, and regulatory requirements.

9.7 Exit Exam

An exit medical examination is offered when an employee leaves the medical surveillance program, either because of termination of employment with [Consultant/Engineer] or because of reassignment to a position not designated or identified to participate in the medical surveillance program. This optional exit examination may be used to assess potential changes in medical status that have occurred during the course of employees' previous work activities, and to establish a medical baseline at the time of departure.

10. MAPS AND SITE CONTROL

10.1 Routes to Hospital and Urgent Care Facility

A hospital and an urgent care facility near the Site have been identified. Maps with written directions to the hospital and urgent care facility are included after the Table of Contents of this HASP. Both figures also include the facility name and phone number. These maps and directions should be accessible to Site workers at all times.

10.2 Site Map

A Site map is located inside the cover of this HASP. The Site map is intended to show the location of the work zone(s), to provide on-Site orientation, and to delineate evacuation routes. Changes may be made to the Site map by the SHSO based on changing Site activities or conditions. The Site map should be accessible to Site workers at all times.

10.3 Buddy System

The buddy system is required at all times when work is performed on-Site. The buddy system includes maintaining regular contact with one or more on-Site [Consultant/Engineer] personnel, clients, and/or contractors such that each employee is observed by (or in verbal contact with) at least one other employee in the work group. For field visits with only one employee on Site, the buddy system shall be implemented via periodic telephone contact with off Site [Consultant/Engineer] personnel.

10.4 Controlled Work Zones

Applies to Task:

☐ 1	☐ 2	☒ 3	☐ 4	☐ 5	☒ 6	☒ 7	☐ 8	☐ 9	☐ 10
☐ 11	☐ 12	☐ 13	☐ 14	☐ 15	☒ 16	☐ 17	☐ 18	☐ 19	☐ 20
☐ 21	☐ 22	☐ 23	☐ 24	☐ 25	☐ 26			☐ Not Applicable	

Delineation of three controlled work zones (Exclusion Zone, Contaminant Reduction Zone, and Support Zone) are required for the Tasks indicated above. The Exclusion Zone is defined as the area on Site where contamination is suspected and tasks are to be performed. The Contaminant Reduction Zone is defined as the area where equipment and workers are to be decontaminated as they leave the Exclusion Zone. The Support Zone is defined as the command area and may serve as a staging and storage area for supplies. For Sites or Tasks that do not require the three controlled work zones, the area where work is to be performed will be called the Work Zone. [Consultant/Engineer] employees must not be allowed into the Contaminant Reduction Zone or Exclusion Zone or the Work Zone until they have received the proper personal protective equipment (PPE) and they have read, understand, and meet the requirements outlined in this HASP. The location and extent of the work zones may be modified as necessary as Site investigation information becomes available.

Visitors to the Site must be continually escorted for safety purposes. Visitors under [Consultant/Engineer]'s direction must check in with the SHSO upon visiting the Site.

For the tasks identified above, the boundaries of the Exclusion Zone, Contaminant Reduction Zone, and Support Zone (or if appropriate, the Work Zone), shall be marked using warning tape, signs, traffic cones, fencing, or other appropriate means.

10.5 Site Access

Certain Site areas require controlled access to the work area. Examples of access controls include sign in/sign out logs, check-in with posted guards, and identification badges for worker verification. [Consultant/Engineer] personnel will adhere to the Site-specific access requirements and monitor that subcontractors and other [Consultant/Engineer] visitors abide by Site-specific access control requirements.

10.6 Inspections

☒ APPLICABLE ☐ NOT APPLICABLE

Based on the hazards identified for the project, periodic health and safety inspections may be performed. Records should be kept on file at the project Site. The frequency for periodic inspections is:

☐ Weekly

☐ Monthly

☐ Other: _____

11. TAILGATE MEETINGS

Tailgate meetings must be held daily prior to starting work to discuss important health and safety issues concerning tasks to be performed. Non-[Consultant/Engineer] Site workers should also communicate health and safety concerns associated with the tasks they will be performing. Topics discussed in the tailgate meetings must be documented in the field logbook.

12. STOP WORK AUTHORITY

[Consultant/Engineer] personnel and subcontractor personnel have the authority and responsibility to issue a Stop Work Order if unsafe actions or conditions are identified. The Stop Work Authority process involves a stop, notify, correct, and resume approach for resolving observed unsafe work actions or conditions. The person issuing the work stoppage will first notify workers engaged in or affected by the unsafe activity or condition and require that associated work be stopped. After this Stop Work Order is issued, the [Consultant/Engineer] project manager and the supervisors for affected or concerned contractors will also be notified. The [Consultant/Engineer] project manager will document the issuance of the Stop Work Order. Work will not resume until the issues and concerns of the Stop Work Order have been adequately addressed.

13. AIR MONITORING

Applies to Task:

☐ 1	☐ 2	☒ 3	☐ 4	☐ 5	☒ 6	☒ 7	☐ 8	☐ 9	☐ 10
☐ 11	☐ 12	☐ 13	☐ 14	☐ 15	☒ 16	☐ 17	☐ 18	☐ 19	☐ 20
☐ 21	☐ 22	☐ 23	☐ 24	☐ 25	☐ 26			☐ Not Applicable	

Air monitoring will be performed to evaluate airborne chemical and/or dust exposure levels within the breathing zone of Site workers. Hazardous conditions may include airborne concentrations that may cause acute or chronic illness, oxygen deficient environments, or

explosive environments. Air monitoring may also be performed to evaluate the adequacy of engineering, administrative, and/or PPE controls. Air monitoring may be "real-time" (the instrument provides immediate results at the project), using multi-gas meters, photoionization detectors (PIDs), or colorimetric tubes, or may be performed by collecting samples and forwarding to a laboratory for analysis and quantification.

The type(s) of air monitoring equipment required and associated action levels are outlined in Appendix D. Monitoring equipment must be calibrated based on the manufacturer's requirements. Calibration results and air monitoring measurements must be documented. Based on the results noted, Site activities, or scope of work changes, the frequency of air monitoring may be adjusted by the SHSO with the consent of the Project Manager and communication with the HSC.

14. PERSONAL PROTECTIVE EQUIPMENT

The levels of PPE required for each task are presented in Appendix E. Required equipment and types of protective clothing materials, as well as an indication of the initial level of protection to be utilized, are listed. The level of protection may be upgraded or downgraded by the SHSO according to controls requirements in Appendix E or according to action levels provided in Appendix D.

If respirators are worn, workers must abide by the company's Respiratory Protection Program.

15. DECONTAMINATION

The SHSO and Project Manager will determine the type and level of decontamination procedures for both personnel and equipment based on evaluation of specific work activities in the controlled work zones. Medical treatment will take precedence over decontamination in the event of a life threatening and/or serious injury/illness. Personnel will perform decontamination in designated areas upon leaving Zones where the potential exists for exposure to hazardous chemical, biological, or environmental conditions.

Decontamination of personnel in Level D (modified) will consist of proper containerization and disposal of coveralls, disposable boots, and gloves (if applicable).

Decontamination of personnel in Level C, will consist, at minimum, of:

- Removal and cleaning/disposal of boot covers, coveralls, and outer gloves;
- Removal, cleaning, and storage of respiratory protection;
- Washing of non-disposable PPE suspected of being contaminated using a soap solution followed by a water rinse; and
- Removal and disposal of inner gloves.

Decontamination of higher PPE levels will be outlined in detail should Site conditions require their use.

Hand tools and sampling equipment shall be decontaminated as needed by washing in decontamination basins with appropriate solutions, or, if possible, by dry decontamination. Wash solutions and PPE may require disposal at a licensed waste facility.

16. SPILL CONTAINMENT

The Tasks performed for this project may involve the handling of drums or containers which contain stored chemicals, hazardous materials, or wastes. Containers shall be inspected and their integrity assured prior to being moved or handled. If the integrity of the container is in question, the container shall be overpacked or its contents transferred to an appropriate container in satisfactory condition. Operations shall be organized and coordinated to minimize movement of containers. Where spills, leaks, or ruptures may potentially occur, a supply of sorbents shall be located in the storage area. Additional spill prevention measures include:

- UN-approved 55-gallon drums, bins, and Baker tanks will be inspected for visible defects upon delivery to the Site;
- UN-approved 55-gallon drums will be inspected to ensure each drum includes a resealable lid with a small resealable sampling port near the top or on the side of the drum, and that the enclosure is not deformed or distorted;
- Containers will not be completely filled to allow for possible expansion of liquid;
- Containers will be stored on wooden pallets to facilitate transport by forklift;
- Containers in the storage area will be inspected for leaks while the containers are being filled, immediately after a relocation to a temporary on-Site storage area, and weekly while being stored; and
- Flat areas will be selected for temporary storage away from high-traffic work areas/zones and storm/sewer drains.

In the event of a release or spill of unknown or hazardous substances, the Site supervisor will designate personnel who will support the spill containment, control, and/or clean-up procedures. The team will request additional off-Site emergency response assistance if necessary based on the type of spill, volume, potential toxicity, etc.

The spill area will be isolated and restricted to only authorized personnel designated to assist with the containment, control, or clean-up activity. Authorized personnel will be trained to contain and clean spills from typical materials and quantities used at the project location. Physical barriers will be set up to warn unauthorized personnel to avoid the affected area. The spill, leak, or incident will be assessed by the team and characterized to determine the appropriate course(s) of action(s) to consider:

- Small spills (i.e., maximum volume of 55 gallons of a liquid or 100 pounds of a solid) may be remediated using absorbent materials by designated personnel;
- Large spills (i.e., liquid volumes > 55 gallons or solid weights > 100 pounds) and/or spills of highly toxic materials may require assistance by off-Site hazardous materials (HAZMAT) teams;
- Attempts shall be made to identify and stop the source(s) of release immediately after donning proper PPE (based on action levels) and performing air monitoring;
- The Site supervisor will direct spill-response operations and stay at the spill area until it has been cleaned, inspected, and cleared for re-entry; and
- The Site supervisor will prepare a spill incident and clean-up report and will communicate findings to the Project and Branch Manager and EHS Department.

17. CONFINED SPACE ENTRY

☐ APPLICABLE ☒ NOT APPLICABLE

If Tasks for this project involve confined-space entry, workers must abide by the Company's Confined Space Entry Program.

18. GLOBALLY-HARMONIZED SYSTEM FOR HAZARD COMMUNICATION

☒ APPLICABLE ☐ NOT APPLICABLE

The following procedures must be followed for chemicals brought onto the Site (e.g. decontamination solution, sampling preservatives, etc.) by [Consultant/Engineer] personnel or by subcontractors while performing the tasks of this project:

- Labels on primary chemical containers must be legible and in good condition;
- Chemicals must be stored in appropriate storage containers;
- Secondary containers and storage cabinets must be correctly and clearly labeled;
- Chemicals incompatible with one another must not be stored together; and
- Workers must receive training on chemical hazards.

When chemicals are used on Site, workers must abide by [Consultant/Engineer]'s GHS Hazard Communication Program. Safety Data Sheets for chemicals used on-Site are provided in Appendix F.

19. HASP AMENDMENTS

Over the course of this project, it is possible that the project-specific hazards and working conditions will change. This HASP may be reviewed and amended as necessary to effectively describe the changing working conditions and measures to mitigate the potential health and

safety issues that may arise during the project. Amendments to the HASP should be briefly described in the following spaces provided. The full text of the amendments should be provided in Appendix A. Additional supporting materials (THAs, SDS, etc) should be added to the relevant sections or appendices of this document.

AMENDMENT 1:

Date: _____ Project Manager: _____ HSC: _____
Brief description of amendment:
_____
_____
_____
_____
_____

AMENDMENT 2:

Date: _____ Project Manager: _____ HSC: _____
Brief description of amendment:
_____
_____
_____
_____
_____

AMENDMENT 3:

Date: _____ Project Manager: _____ HSC: _____
Brief description of amendment:
_____
_____
_____
_____
_____

Appendix A: HASP Amendments

Discuss details of amendments to this HASP here. Include amendment number, date, and details of amendments.

Appendix B: Task Hazard Analyses

		Driving/Vehicles	Reconnaissance & Mobilization/Demobililization	Work Near Water	Work On Boats	Sediment Core Collection & Monitoring Equipment Deployment and Retrieval	Work Around Heavy Equipment	Sediment & Soil Core Logging and Sampling	Waste Characterization Sampling & Drum Handling
Task 1:	PD-3: Additional Reconnaissance for Debris Removal	X		X	X	X			
Task 2:	PD-4: A Plan for Debris Removal, Decontamination, and Disposal								
Task 3:	PD-5: Detailed Survey and Assessment of Existing Bulkheads for Remedy Implementation	X	X	X	X	X	X	X	X
Task 4:	PD-6: A Plan for Staging Site Selection and Implementation Plan	X	X						
Task 5:	PD-7: Evaluation of Potential Groundwater Upwelling Areas and Measurement of Discharge Rates	X		X	X	X			
Task 6:	PD-8: Evaluation of Potentially Mobile NAPL in Native Sediments	X		X	X	X	X	X	X
Task 7:	PD-9: Additional Sampling for Polychlorinated Biphenyls (PCBs)	X		X	X	X	X	X	X
Task 8:	PD-10: Stabilized Material Use and Treatability Testing								
Task 9:	PD-11: Study of Canal Operations	X		X	X				
Task 10:	PD-12: Groundwater Model Update								
Task 11:	PD-13: Upland Area Evaluation for Cut-off Walls	X	X	X					
Task 12:	PD 14: Compliance Plan for Federal and State Archeological Requirements								
Task 13:	PD-15: Laboratory Evaluation of NAPL Mobility								
Task 14:	PD-16: Revisions to Sediment and Hydrodynamic Models								
Task 15:	PD-17: Evaluation of Active Cap Treatment Technologies								
Task 16:	PD-18: Geotechnical Characterization for Cap Design	X		X	X	X	X	X	X
Task 17:	PD-19: Laboratory Evaluation of ISS Performance								
Task 18:	PD-20: Technical Workshops								
Task 19:	PD-21: Sediment Stabilization and Treatment Technologies Treatability Studies								
Task 20:	PD-22: Bathymetric Survey after Flushing Tunnel Operation	X		X	X	X			
Task 21:	PD-23: Dredge Volume Field Study	X		X	X	X			
Task 22:	PD-24: Propeller Wash and Cap Armoring Study								
Task 23:	PD-25: CSM Refinement								
Task 24:	PD-26: Basis of Design Report								

THAs for these tasks are presented in the following pages

PRE-WORK THA

THA Title:	**Driving/Vehicles Task Hazard Analysis**	**Date:**	**18 February 2014**
Project Name:	**Gowanus Canal Superfund Site**	**Client Name:**	**National Grid**
Project Number:		**Client Project Manager:**	
Project Location:	**Brooklyn, New York**	**[Consultant/Engineer] Project Manager:**	
Scope of Work Summary:	The Pre-Design Work will involve personnel driving both to and from the Site, as well as around the Site.		

Work Steps	Process or Activity	Hazards	Hazard Control
• Driving to/from/around the Site		• Traffic/road hazards	• Plan your route to and from the Site • Park only in safe locations, out of the flow of traffic • Avoid having to back up out of a parking space • Be careful when entering and exiting roadways - be aware of traffic, cyclists, and pedestrians • Pull over to use your cell phone - do not use your cell phone while driving • Wear a high visibility vest when working near traffic • Remember that turning right on a red light is not allowed in New York City • When driving on properties, be aware the there may be uneven ground and tire hazards and choose routes carefully - always walk new routes first
		• Work near water	• Avoid driving vehicles near the edge of the Canal
		• Crime	• Always lock vehicles if parked on the street • Avoid leaving valuables in vehicles overnight • Keep valuables left in vehicles covered or out of sight (i.e., in the trunk)
•		•	•

Min. Personal Protective Equipment (PPE):	• Hardhat • Safety glasses • Gloves • Steel-toed/hard-toed boots • Hearing protection when working around loud noises • Traffic vest when working around vehicles or heavy equipment • Coast Guard-approved Personal Floatation Device (PFD) when working on or near water • Tyvek suits may be worn if desired to protect against getting contaminated water or sediment on clothing or skin

Individuals Must Sign the last page of this THA after review.

PRE-WORK THA

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
WALKING/WORKING SURFACES		
☒	☒ Uneven terrain ☒ Slippery surfaces	☒ Walkways are cleared of equipment, vegetation, excavated material, tools and debris ☒ Pits and floor openings are covered or otherwise guarded ☒ Work areas are illuminated adequately; field operations are not conducted before sunrise or after sunset unless adequate lighting is provided. ☐ Spills are cleaned up promptly ☒ Salt applied to icy areas, snow cleared from walkways
☐	LADDERS / STAIRS ☐ Extension Ladders ☐ Step Ladders ☐ Fixed Ladders ☐ Stairs	☐ Employees trained in safe ladder use at safety meeting ☐ Extension ladders are properly footed, secured at top, and setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity. **Ladders/Stairs Comments:** _____
☐	MANLIFT used to reach work ☐ Scissor Lift ☐ Extensible Boom ☐ Articulated Boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use. **Manlift Comments:** _____
WORKING ALONE		
☒	☒ Getting injured or incapacitated with no one else around to help ☒ Falling victim to crime	☒ Someone else knows your whereabouts, what you're doing and when you should be expected back to their office or project site location. This will be accomplished by communicating three (3) times at a minimum with the supervisor or the project manager 1 – Upon Arrival 2 – Midway through the day 3 – Upon Departure ☒ Ensure the area has wireless coverage; summon alternate communication method if wireless phones are not operable. ☒ Checked the weather forecast to avoid being caught up in bad weather conditions; ☒ Ensured that vehicle has sufficient fuel and is well maintained; ☒ Allowed self sufficient time for the trip so that you are not rushing; ☒ Drive with any bags, records and equipment hidden so that you are not seen hiding them as you park. **Working Alone Comments:** _____
EXCAVATIONS / TRENCHING/UNDERGROUND HAZARDS		
☐	☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. (specify below) ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard (specify below) ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Underground utilities have been identified and marked. ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ Hand digging within 3' of utility locations. ☐ Excavations are protected by perimeter fencing (not barricade tape): (☐ Rigid fence - chain link or wood, ☐ safety fence 6' from edge.) **Excavation Comments:** _____

PRE-WORK THA

CONFINED SPACES		
☐	☐ No Serious Hazards ☐ Toxic atmosphere ☐ Carbon monoxide ☐ Hydrogen sulfide ☐ _____ ☐ Flammable atmosphere ☐ Low oxygen ☐ Combustible dust ☐ Other Serious Hazard: _____	☐ Confined space is altered so that it is no longer a confined space. (describe below) ☐ Confined space is downgraded to a non-permit confined space. (identify which spaces below) ☐ Alternate Entry is used. (Identify which space qualify for confined space entry below) ☐ Full permit-required confined space entry is used due to presence of serious hazards. ☐ Rescue team has been notified (☐ Paid FD ☐ Volunteer FD ☐ Plant Rescue) Rescue team: _____ Phone number: _____ ☐ All entrants and attendants for Alternate Entry and Permit-Required Entry have confined space entry training. **Confined Space Comments:** _____
BOAT OPERATIONS/WORKING ON or NEAR WATER and ICE		
☐	☐ Drowning ☐ Hypothermia	☐ Only qualified employees are operating the boat ☐ Coast Guard-approved Personal Flotation Device (PFD), sized and adjusted to the wearer, is worn by all when involved in boat operations. ☐ A float plan is completed prior to leaving dock. ☐ Emergency equipment like ring buoy, flares and fire extinguishers are present **Boat, Water Operations Comments:** _____
DRILLING		
☐	☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills	☐ Contractor inspected the drill rig ☐ High visibility vests, hard hats are being worn near the equipment ☐ Operators and helpers will maintain a safe distance to moving parts. All those working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ IDW is being managed as per regulations ☐ Area is surveyed for overhead utilities ☐ Hearing protection is used when working near the rig ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill Kit Located: _____ **Drilling Operations Comments:** _____
HEAVY EQUIPMENT [other than cranes]		
☐	☐ Max. safe slope for each vehicle will be followed ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Bulldozer ☐ Excavator ☐ Front Loader ☐ Mini Skid Steer (Bobcat) ☐ Mini Excavator ☐ Dump Truck ☐ Drill/Boring Rig ☐ Lull / Material Handler ☐ Forklift ☐ Manlift - specify type(s) ☐ Land Clearing loader	☐ Qualified persons operate all heavy equipment. (certificate is required for forklift and lull operators) ☐ Equipment will be inspected upon mobilization ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators will be reminded of seatbelt use by: _____ ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope for each vehicle will be followed ☐ Counterweight swing radius will be barricaded. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. Crane hook attachments will be used (specify): _____ ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____

PRE-WORK THA

CRANES

☐	☐ Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Wire rope failure – condition, loading, safety lines ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ _____ ☐ _____ ☐ _____	☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan will be developed and approved prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist will be completed and signed. ☐ A Critical Lift Checklist will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a discrete channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to winds exceeding 35mph. Hoisting equipment will be re-inspected and confirmed to be in operable condition prior to re-use. ☐ Cranes will not travel with personnel on the platform. Note that [Contractor] personnel are prohibited from entering the immediate vicinity of the crane during operation, unless prior approval has been obtained from the Corporate EHS Dept. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Total weight of the load will not exceed 50% of the rated capacity for the crane radius and configuration. ☐ Crane hooks will be moused or provided with safety latches. ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope (<1%) will be followed ☐ Counterweight swing radius will be barricaded. ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____ **Crane Hazards Comments:** _____ [Consultant/Engineer] personnel are prohibited from suspended personnel lifting.

ENVIRONMENTAL HAZARDS (NON CHEMICAL)

☐	☐ Heat Stress ☐ Cold Stress ☐ Insects, spiders, ticks ☐ Wild animals ☐ Mold, fungi ☐ Poisonous plants ☐ Hazardous noise	☐ Heat/Cold stress are monitored in accordance with [Consultant/Engineer] procedures ☐ Fluids are provided to prevent worker dehydration ☐ Types and injury potential of snakes, insects, spiders are reviewed with workers ☐ Insect repellant is used, PPE is used to protect against sting/bite injuries. ☐ All potentially poisonous plants such as poison ivy, poison oak, poison sumac are identified, long sleeve shirt or Tyvek is worn or a barrier cream is used when near these plants ☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) **Environmental Hazards Comments:** _____

POWER TOOLS, HAND TOOLS, and EXTENSION CORDS

☐	Eye injury, hand/arm cuts, electrical shock, strains, foot injuries, dust ☐ Grinders ☐ Needle Gun ☐ Chop saw ☐ Chain saw ☐ Trimmer ☐ Concrete/asphalt saw	☐ All tools and electrical cords will be inspected upon mobilization by: _____ ☐ All tools and electrical cords in-use will be inspected daily by: _____ ☐ Grinder speeds will not exceed grinding wheel ratings. ☐ Water or wet cutting performed to control dust ☐ Respirators used to prevent exposure to dust (respirator type: _____) ☐ Thorough utility survey conducted prior to any concrete cutting, coring ☐ Face shield and safety glasses used (required for all grinders, jackhammers, chain saws, etc.) ☐ Kevlar chaps and jacket (required for all chainsaw work) ☐ Hearing protection required for which tools or areas: _____ ☐ All extension cords are in good condition with no cuts through outer insulation, ground plugs are present, and no "vinyl tape" repairs. **Tool & Cord Comments:** _____

PRE-WORK THA

MANUAL MATERIAL HANDLING / MATERIAL STORAGE / HOUSEKEEPING

☐	Back or shoulder strain, struck by falling objects, trips and falls, incompatible materials (fire or explosion) ☐ Hvy manual lifting (>30 lbs) ☐ Chemical storage ☐ Compressed gas storage ☐ Tall storage greater than 2 pallets stacked. ☐ Material & equipment laydown areas ☐ Debris removal	☐ Mechanical lifting equipment used to reduce manual material handling: (☐ Forklift/Lull ☐ Heavy Equipment ☐ Chainfall ☐ _____) ☐ Manual lifting more than 50 lbs by a single person will be avoided. ☐ Good manual lifting techniques will be reviewed prior to site work. ☐ Incompatible chemicals will be separated by 20' ☐ Secondary containment will be provided for the following chemicals: _____ ☐ Safety equipment will be located near chemical storage. ☐ Spill Kit ☐ Emergency Shower ☐ Eyewash ☐ Drench Hose ☐ Splash PPE ☐ Flammable gases and oxygen will be separated by 20'. ☐ All compressed gas cylinders will be transported vertically and secured upright. ☐ Equipment and materials will not be stored on site ☐ Debris will be moved daily and placed in designated areas. **Material Handling & Housekeeping Comments:** _____

TRAFFIC & SIDEWALK OBSTRUCTION

☒	☒ Vehicle accidents ☒ Pedestrians struck by vehicles or heavy equipment ☒ Pedestrians falls ☐ Pedestrian struck-by falling objects	☐ DOT signal devices will be used to re-route vehicles around excavations or busy site entrances/exits that affect road traffic. ☐ Flaggers will be used and have DOT Flagger Training ☐ Pedestrian traffic will be safely routed around or over excavations. ☐ Pedestrian traffic will be safely routed around or under overhead work. **Traffic & Sidewalk Comments:** Be careful when entering and exiting roadways - be aware of traffic and pedestrians. Pull over to use your cell phone - do not use your cell phone while driving. Wear a high visibility vest when working near traffic.

HAZARDOUS WASTE SITE WORK

☐	☐ Exposure to hazardous vapors or dust, contact with contaminated materials, fire, and explosion. Contaminants of Concern and hazardous chemicals include: ☐ Volatile organic compounds (describe: _____) ☐ Semivolatile organic cmpds (describe: _____) ☐ Metal dusts (describe _____) ☐ PCBs ☐ Caustic (NaOH) ☐ Acid (H_2SO_4, HCl) ☐ Other hazardous waste site hazards are covered elsewhere in the HASP)	☐ Site workers with a potential for contact with contaminated materials will have OSHA 40-hour training, current 8-hour refresher, and medical exam. ☐ No intrusive work activities or areas are anticipated with current scope of work. Intrusive work activities include: _____ The perimeter of intrusive work areas are identified by: _____ Decontamination of personnel or equipment is not anticipated with the current scope of work. ☐ Decontamination of personnel and small tools will be conducted as follows: _____ ☐ Decontamination of heavy equipment will be conducted as follows: _____ ☐ Heavy equipment leaving the site will be inspected by: _____ ☐ Work area monitoring is not anticipated with the current scope of work. ☐ Work Area Air Monitoring as follows for (dust, VOCs, etc.) **OR** see attached. _____ to _____ Level C: Tyvek, boot covers, nitrile gloves, half or full face respirator with _____ cartridges changed daily _____ to _____ Level B: Same as above except supplied air respirator _____ to _____ STOP work, contact EHS Department ☐ Community Air Monitoring is not anticipated with the current scope of work. ☐ Community Air Monitoring is required per the attached document. **Comments/Other:** _____

PRE-WORK THA

EMERGENCY RESPONSE (911 Service is Available ☒ Yes ☐ No)			
Emergency Medical Treatment - Hospital Name: Hospital Address:	Brooklyn Hospital Center 121 DeKalb Avenue Brooklyn, New York 11205	**Phone:**	718-250-8000
Non-Emergency Med. Treatment - Clinic Name: Occupational Clinic Address:	Interfaith Medical Center 1545 Atlantic Avenue Brooklyn, New York 11213	**Phone:**	718-613-4988
Fire Department Name	New York Fire Department	**Phone:**	911
Spill Response:	New York Fire Department	**Phone:**	911
Client Representative Name::		**Office:**	
		Cell:	
[Consultant/Engineer] Project Manager Name:		**Office:**	
		Cell:	
[Consultant/Engineer] Corporate H&S Name:		**Office:**	
		Cell:	
Emergency Response Comments:			

Date:	
Project Name:	**Gowanus Canal Superfund Site**
THA Title:	**Driving/Vehicle Task Hazard Analysis**
Subcontractor Name:	
[Consultant/Engineer] Representative (reviewed by):	
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO [CONTRACTOR] PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

PRE-WORK THA

THA Title:	**Reconnaissance & Mobilization/Demobilization Task Hazard Analysis**	**Date:**	**18 February 2014**
Project Name:	**Gowanus Canal Superfund Site**	**Client Name:**	**National Grid**
Project Number:		**Client Project Manager:**	
Project Location:	**Brooklyn, New York**	**[Consultant/Engineer] Project Manager:**	
Scope of Work Summary:	The Pre-Design Work will involve personnel performing reconnaissance and mobilization/demobilization activities at properties along and near the Gowanus Canal.		

Work Steps	Process or Activity	Hazards	Hazard Control
• Driving to/from/around the Site		• Traffic/road hazards	• Plan your route to and from the Site • Park only in safe locations, out of the flow of traffic • Avoid having to back up out of a parking space • Be careful when entering and exiting roadways - be aware of traffic, cyclists, and pedestrians • Pull over to use your cell phone - do not use your cell phone while driving • Wear a high visibility vest when working near traffic • Remember that turning right on a red light is not allowed in New York City • When driving on properties, be aware the there may be uneven ground and tire hazards and choose routes carefully - always walk new routes first
• Walking on properties around the Site		• Uneven ground and slip, trip, fall hazards	• Whenever possible, choose walking paths that avoid uneven ground and slip, trip, fall hazards • Point out hazards to fellow field team members
		• Work near water	• Whenever possible, avoid walking near to the edge of the Canal • If going near to the edge of the Canal is necessary, wear a PFD
• Drop off and pick up of heavy machinery, equipment, and supplies, and site setup		• Work around heavy equipment and large vehicles	• Wear a high visibility vest when working around large vehicles and heavy equipment • If necessary, only approach large vehicles/heavy equipment after making contact with the operator • Never approach large vehicles/heavy equipment out of the line of sight of the operator • Ensure that entrance and egress routes for large vehicles provide sufficient space for vehicles to maneuver safely • Ensure that large vehicles/heavy equipment avoid overhead hazards • Avoid having large vehicles/heavy equipment travel over soft ground or uneven terrain
•		•	•

Min. Personal Protective Equipment (PPE):	• Hardhat • Safety glasses • Gloves • Steel-toed/hard-toed boots • Hearing protection when working around loud noises • Traffic vest when working around vehicles or heavy equipment • Coast Guard-approved Personal Floatation Device (PFD) when working on or near water • Tyvek suits may be worn if desired to protect against getting contaminated water or sediment on clothing or skin

Individuals Must Sign the last page of this THA after review.

PRE-WORK THA

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
WALKING/WORKING SURFACES		
☒	☒ Uneven terrain ☒ Slippery surfaces	☒ Walkways are cleared of equipment, vegetation, excavated material, tools and debris ☒ Pits and floor openings are covered or otherwise guarded ☒ Work areas are illuminated adequately; field operations are not conducted before sunrise or after sunset unless adequate lighting is provided. ☒ Spills are cleaned up promptly ☒ Salt applied to icy areas, snow cleared from walkways
☐	LADDERS / STAIRS ☐ Extension Ladders ☐ Step Ladders ☐ Fixed Ladders ☐ Stairs	☐ Employees trained in safe ladder use at safety meeting ☐ Extension ladders are properly footed, secured at top, and setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity. **Ladders/Stairs Comments:** _____
☐	MANLIFT used to reach work ☐ Scissor Lift ☐ Extensible Boom ☐ Articulated Boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use. **Manlift Comments:** _____
WORKING ALONE		
☒	☒ Getting injured or incapacitated with no one else around to help ☒ Falling victim to crime	☒ Someone else knows your whereabouts, what you're doing and when you should be expected back to their office or project site location. This will be accomplished by communicating three (3) times at a minimum with the supervisor or the project manager 1 – Upon Arrival 2 – Midway through the day 3 – Upon Departure ☒ Ensure the area has wireless coverage; summon alternate communication method if wireless phones are not operable. ☒ Checked the weather forecast to avoid being caught up in bad weather conditions; ☒ Ensured that vehicle has sufficient fuel and is well maintained; ☒ Allowed self sufficient time for the trip so that you are not rushing; ☒ Drive with any bags, records and equipment hidden so that you are not seen hiding them as you park. **Working Alone Comments:** _____
EXCAVATIONS / TRENCHING/UNDERGROUND HAZARDS		
☐	☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. (specify below) ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard (specify below) ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Underground utilities have been identified and marked. ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ Hand digging within 3' of utility locations. ☐ Excavations are protected by perimeter fencing (not barricade tape): (☐ Rigid fence - chain link or wood, ☐ safety fence 6' from edge.) **Excavation Comments:** _____

PRE-WORK THA

CONFINED SPACES		
☐	☐ No Serious Hazards ☐ Toxic atmosphere ☐ Carbon monoxide ☐ Hydrogen sulfide ☐ _____ ☐ Flammable atmosphere ☐ Low oxygen ☐ Combustible dust ☐ Other Serious Hazard: _____	☐ Confined space is altered so that it is no longer a confined space. (describe below) ☐ Confined space is downgraded to a non-permit confined space. (identify which spaces below) ☐ Alternate Entry is used. (Identify which space qualify for confined space entry below) ☐ Full permit-required confined space entry is used due to presence of serious hazards. ☐ Rescue team has been notified (☐ Paid FD ☐ Volunteer FD ☐ Plant Rescue) Rescue team: _____ Phone number: _____ ☐ All entrants and attendants for Alternate Entry and Permit-Required Entry have confined space entry training. **Confined Space Comments:** _____
BOAT OPERATIONS/WORKING ON or NEAR WATER and ICE		
☐	☐ Drowning ☐ Hypothermia	☐ Only qualified employees are operating the boat ☐ Coast Guard-approved Personal Flotation Device (PFD), sized and adjusted to the wearer, is worn by all when involved in boat operations. ☐ A float plan is completed prior to leaving dock. ☐ Emergency equipment like ring buoy, flares and fire extinguishers are present **Boat, Water Operations Comments:** _____
DRILLING		
☐	☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills	☐ Contractor inspected the drill rig ☐ High visibility vests, hard hats are being worn near the equipment ☐ Operators and helpers will maintain a safe distance to moving parts. All those working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ IDW is being managed as per regulations ☐ Area is surveyed for overhead utilities ☐ Hearing protection is used when working near the rig ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill Kit Located: _____ **Drilling Operations Comments:** _____
HEAVY EQUIPMENT [other than cranes]		
☐	☐ Max. safe slope for each vehicle will be followed ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Bulldozer ☐ Excavator ☐ Front Loader ☐ Mini Skid Steer (Bobcat) ☐ Mini Excavator ☐ Dump Truck ☐ Drill/Boring Rig ☐ Lull / Material Handler ☐ Forklift ☐ Manlift - specify type(s) ☐ Land Clearing loader	☐ Qualified persons operate all heavy equipment. (certificate is required for forklift and lull operators) ☐ Equipment will be inspected upon mobilization ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators will be reminded of seatbelt use by: _____ ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope for each vehicle will be followed ☐ Counterweight swing radius will be barricaded. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. Crane hook attachments will be used (specify): _____ ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____

PRE-WORK THA

CRANES

☐	☐ Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Wire rope failure – condition, loading, safety lines ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ _____ ☐ _____ ☐ _____	☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan will be developed and approved prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist will be completed and signed. ☐ A Critical Lift Checklist will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a discrete channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to winds exceeding 35mph. Hoisting equipment will be re-inspected and confirmed to be in operable condition prior to re-use. ☐ Cranes will not travel with personnel on the platform. Note that [Contractor] personnel are prohibited from entering the immediate vicinity of the crane during operation, unless prior approval has been obtained from the Corporate EHS Dept. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Total weight of the load will not exceed 50% of the rated capacity for the crane radius and configuration. ☐ Crane hooks will be moused or provided with safety latches. ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope (<1%) will be followed ☐ Counterweight swing radius will be barricaded. ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____ **Crane Hazards Comments:** _____ [Consultant/Engineer] personnel are prohibited from suspended personnel lifting.

ENVIRONMENTAL HAZARDS (NON CHEMICAL)

☒	☒ Heat Stress ☒ Cold Stress ☒ Insects, spiders, ticks ☐ Wild animals ☐ Mold, fungi ☐ Poisonous plants ☐ Hazardous noise	☒ Heat/Cold stress are monitored in accordance with [Consultant/Engineer] procedures ☒ Fluids are provided to prevent worker dehydration ☒ Types and injury potential of snakes, insects, spiders are reviewed with workers ☒ Insect repellant is used, PPE is used to protect against sting/bite injuries. ☐ All potentially poisonous plants such as poison ivy, poison oak, poison sumac are identified, long sleeve shirt or Tyvek is worn or a barrier cream is used when near these plants ☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) **Environmental Hazards Comments:** _____

POWER TOOLS, HAND TOOLS, and EXTENSION CORDS

☐	Eye injury, hand/arm cuts, electrical shock, strains, foot injuries, dust ☐ Grinders ☐ Needle Gun ☐ Chop saw ☐ Chain saw ☐ Trimmer ☐ Concrete/asphalt saw	☐ All tools and electrical cords will be inspected upon mobilization by: _____ ☐ All tools and electrical cords in-use will be inspected daily by: _____ ☐ Grinder speeds will not exceed grinding wheel ratings. ☐ Water or wet cutting performed to control dust ☐ Respirators used to prevent exposure to dust (respirator type: _____) ☐ Thorough utility survey conducted prior to any concrete cutting, coring ☐ Face shield and safety glasses used (required for all grinders, jackhammers, chain saws, etc.) ☐ Kevlar chaps and jacket (required for all chainsaw work) ☐ Hearing protection required for which tools or areas: _____ ☐ All extension cords are in good condition with no cuts through outer insulation, ground plugs are present, and no "vinyl tape" repairs. **Tool & Cord Comments:** _____

PRE-WORK THA

MANUAL MATERIAL HANDLING / MATERIAL STORAGE / HOUSEKEEPING

☒	Back or shoulder strain, struck by falling objects, trips and falls, incompatible materials (fire or explosion) ☒ Hvy manual lifting (>30 lbs) ☐ Chemical storage ☐ Compressed gas storage ☐ Tall storage greater than 2 pallets stacked. ☐ Material & equipment laydown areas ☐ Debris removal	☒ Mechanical lifting equipment used to reduce manual material handling: (☒ Forklift/Lull ☒ Heavy Equipment ☐ Chainfall ☐ _____) ☒ Manual lifting more than 50 lbs by a single person will be avoided. ☒ Good manual lifting techniques will be reviewed prior to site work. ☐ Incompatible chemicals will be separated by 20' ☐ Secondary containment will be provided for the following chemicals: _____ ☐ Safety equipment will be located near chemical storage. ☐ Spill Kit ☐ Emergency Shower ☐ Eyewash ☐ Drench Hose ☐ Splash PPE ☐ Flammable gases and oxygen will be separated by 20'. ☐ All compressed gas cylinders will be transported vertically and secured upright. ☐ Equipment and materials will not be stored on site ☐ Debris will be moved daily and placed in designated areas. **Material Handling & Housekeeping Comments:** _____

TRAFFIC & SIDEWALK OBSTRUCTION

☐	☐ Vehicle accidents ☐ Pedestrians struck by vehicles or heavy equipment ☐ Pedestrians falls ☐ Pedestrian struck-by falling objects	☐ DOT signal devices will be used to re-route vehicles around excavations or busy site entrances/exits that affect road traffic. ☐ Flaggers will be used and have DOT Flagger Training ☐ Pedestrian traffic will be safely routed around or over excavations. ☐ Pedestrian traffic will be safely routed around or under overhead work. **Traffic & Sidewalk Comments:** _____

HAZARDOUS WASTE SITE WORK

☒	☒ Exposure to hazardous vapors or dust, contact with contaminated materials, fire, and explosion. Contaminants of Concern and hazardous chemicals include: ☒ Volatile organic compounds (describe: BTEX) ☒ Semivolatile organic cmpds (describe: Coal tar and coal tar products) ☒ Metal dusts (describe arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, and zinc) ☒ PCBs ☐ Caustic (NaOH) ☐ Acid (H_2SO_4, HCl) ☒ Other hazardous waste site hazards are covered elsewhere in the HASP)	☒ Site workers with a potential for contact with contaminated materials will have OSHA 40-hour training, current 8-hour refresher, and medical exam. ☐ No intrusive work activities or areas are anticipated with current scope of work. Intrusive work activities include: _____ The perimeter of intrusive work areas are identified by: _____ Decontamination of personnel or equipment is not anticipated with the current scope of work. ☐ Decontamination of personnel and small tools will be conducted as follows: _____ ☐ Decontamination of heavy equipment will be conducted as follows: _____ ☐ Heavy equipment leaving the site will be inspected by: _____ ☐ Work area monitoring is not anticipated with the current scope of work. ☒ Work Area Air Monitoring as follows for (dust, VOCs, etc.) **OR** see attached. _____ to _____ Level C: Tyvek, boot covers, nitrile gloves, half or full face respirator with _____ cartridges changed daily _____ to _____ Level B: Same as above except supplied air respirator _____ to _____ STOP work, contact EHS Department ☐ Community Air Monitoring is not anticipated with the current scope of work. ☐ Community Air Monitoring is required per the attached document. **Comments/Other:** _____

PRE-WORK THA

EMERGENCY RESPONSE (911 Service is Available ☒ Yes ☐ No)			
Emergency Medical Treatment - Hospital Name: Hospital Address:	Brooklyn Hospital Center 121 DeKalb Avenue Brooklyn, New York 11205	**Phone:**	718-250-8000
Non-Emergency Med. Treatment - Clinic Name: Occupational Clinic Address:	Interfaith Medical Center 1545 Atlantic Avenue Brooklyn, New York 11213	**Phone:**	718-613-4988
Fire Department Name	New York Fire Department	**Phone:**	911
Spill Response:	New York Fire Department	**Phone:**	911
Client Representative Name::		**Office:**	
		Cell:	
[Consultant/Engineer] Project Manager Name:		**Office:**	
		Cell:	
[Consultant/Engineer] Corporate H&S Name:		**Office:**	
		Cell:	
Emergency Response Comments:			

Date:	
Project Name:	**Gowanus Canal Superfund Site**
THA Title:	**Reconnaissance & Mobilization/Demobilization Task Hazard Analysis**
Subcontractor Name:	
[Consultant/Engineer] Representative (reviewed by):	
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO [CONTRACTOR] PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

PRE-WORK THA

THA Title:	**Work Near Water Task Hazard Analysis**	**Date:**	**17 February 2014**
Project Name:	**Gowanus Canal Superfund Site**	**Client Name:**	**National Grid**
Project Number:		**Client Project Manager:**	
Project Location:	**Brooklyn, New York**	**[Consultant/Engineer] Project Manager:**	
Scope of Work Summary:	The Pre-Design Work will involve work near water (i.e., work performed near to the edges of the Gowanus Canal). (Work on boats is discussed in another THA.) Work that will be performed near water will include loading/unloading boats/barges, the assessment of bulkheads and the advancement of soil borings using drill rigs. In some locations, ladders may be used to access locations along the edge of the Canal (e.g., to permit inpection of bulkheads or to facilitate the offloading of samples from boats).		

Work Steps	**Process or Activity**	**Hazards**	**Hazard Control**
• Working near water		• Working near water	• When possible avoid working so close to the Canal edge that there is the risk of falling in • When work must be performed close to the Canal edge, all personnel must wear PFDs • When work must be performed close to the Canal edge a ring buoy should be available to assist someone who falls into the Canal
		• Slip/trip/fall (STF) hazards	• Avoid STF hazards by choosing clear paths when moving near to the edge of the Canal (or anywhere else) • Keep walkways clear of STF hazards • Mark STF hazards that cannot be removed or avoided completely • Be aware that areas close to the Canal edge may be wet or slippery (especially those areas that are submerged at high tide)
		• Ladders	• Always maintain three points of contact when climbing or descending ladders • Be aware that ladder steps may be wet/slippery • Avoid carrying items up/down ladders
•		•	•

Min. Personal Protective Equipment (PPE):	• Hardhat • Safety glasses • Gloves • Steel-toed/hard-toed boots • Hearing protection when working around loud noises • Traffic vest when working around vehicles or heavy equipment • Coast Guard-approved Personal Floatation Device (PFD) when working on or near water • Tyvek suits may be worn if desired to protect against getting contaminated water or sediment on clothing or skin

Individuals Must Sign the last page of this THA after review.

PRE-WORK THA

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
WALKING/WORKING SURFACES		
☒	☒ Uneven terrain ☒ Slippery surfaces	☒ Walkways are cleared of equipment, vegetation, excavated material, tools and debris ☒ Pits and floor openings are covered or otherwise guarded ☒ Work areas are illuminated adequately; field operations are not conducted before sunrise or after sunset unless adequate lighting is provided. ☒ Spills are cleaned up promptly ☒ Salt applied to icy areas, snow cleared from walkways
☒	LADDERS / STAIRS ☒ Extension Ladders ☐ Step Ladders ☒ Fixed Ladders ☒ Stairs	☒ Employees trained in safe ladder use at safety meeting ☒ Extension ladders are properly footed, secured at top, and setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☒ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity. **Ladders/Stairs Comments:** _____
☐	MANLIFT used to reach work ☐ Scissor Lift ☐ Extensible Boom ☐ Articulated Boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use. **Manlift Comments:** _____
WORKING ALONE		
☐	☐ Getting injured or incapacitated with no one else around to help ☐ Falling victim to crime	☒ Someone else knows your whereabouts, what you're doing and when you should be expected back to their office or project site location. This will be accomplished by communicating three (3) times at a minimum with the supervisor or the project manager 1 – Upon Arrival 2 – Midway through the day 3 – Upon Departure ☐ Ensure the area has wireless coverage; summon alternate communication method if wireless phones are not operable. ☐ Checked the weather forecast to avoid being caught up in bad weather conditions; ☐ Ensured that vehicle has sufficient fuel and is well maintained; ☐ Allowed self sufficient time for the trip so that you are not rushing; ☐ Drive with any bags, records and equipment hidden so that you are not seen hiding them as you park. **Working Alone Comments:** _____
EXCAVATIONS / TRENCHING/UNDERGROUND HAZARDS		
☐	☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. (specify below) ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard (specify below) ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Underground utilities have been identified and marked. ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ Hand digging within 3' of utility locations. ☐ Excavations are protected by perimeter fencing (not barricade tape): (☐ Rigid fence - chain link or wood, ☐ safety fence 6' from edge.) **Excavation Comments:** _____

PRE-WORK THA

CONFINED SPACES		
☐	☐ No Serious Hazards ☐ Toxic atmosphere ☐ Carbon monoxide ☐ Hydrogen sulfide ☐ _____ ☐ Flammable atmosphere ☐ Low oxygen ☐ Combustible dust ☐ Other Serious Hazard: _____	☐ Confined space is altered so that it is no longer a confined space. (describe below) ☐ Confined space is downgraded to a non-permit confined space. (identify which spaces below) ☐ Alternate Entry is used. (Identify which space qualify for confined space entry below) ☐ Full permit-required confined space entry is used due to presence of serious hazards. ☐ Rescue team has been notified (☐ Paid FD ☐ Volunteer FD ☐ Plant Rescue) Rescue team: _____ Phone number: _____ ☐ All entrants and attendants for Alternate Entry and Permit-Required Entry have confined space entry training. **Confined Space Comments:** _____
BOAT OPERATIONS/WORKING ON or NEAR WATER and ICE		
☒	☒ Drowning ☒ Hypothermia	☐ Only qualified employees are operating the boat ☒ Coast Guard-approved Personal Flotation Device (PFD), sized and adjusted to the wearer, is worn by all when involved in boat operations. ☐ A float plan is completed prior to leaving dock. ☐ Emergency equipment like ring buoy, flares and fire extinguishers are present **Boat, Water Operations Comments:** A PFD should be worn whenever there is the risk of falling into the Canal. A ring buoy should be on hand to assist anyone who falls into the water.
DRILLING		
☐	☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills	☐ Contractor inspected the drill rig ☐ High visibility vests, hard hats are being worn near the equipment ☐ Operators and helpers will maintain a safe distance to moving parts. All those working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ IDW is being managed as per regulations ☐ Area is surveyed for overhead utilities ☐ Hearing protection is used when working near the rig ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill Kit Located: _____ **Drilling operations Comments:** _____
HEAVY EQUIPMENT [other than cranes]		
☐	☐ Max. safe slope for each vehicle will be followed ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Bulldozer ☐ Excavator ☐ Front Loader ☐ Mini Skid Steer (Bobcat) ☐ Mini Excavator ☐ Dump Truck ☐ Drill/Boring Rig ☐ Lull / Material Handler ☐ Forklift ☐ Manlift - specify type(s) ☐ Land Clearing loader	☐ Qualified persons operate all heavy equipment. (certificate is required for forklift and lull operators) ☐ Equipment will be inspected upon mobilization ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators will be reminded of seatbelt use by: _____ ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope for each vehicle will be followed ☐ Counterweight swing radius will be barricaded. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. Crane hook attachments will be used (specify): _____ ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____

PRE-WORK THA

CRANES

☐	☐ Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Wire rope failure – condition, loading, safety lines ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ _____ ☐ _____ ☐ _____	☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan will be developed and approved prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist will be completed and signed. ☐ A Critical Lift Checklist will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a discrete channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to winds exceeding 35mph. Hoisting equipment will be re-inspected and confirmed to be in operable condition prior to re-use. ☐ Cranes will not travel with personnel on the platform. Note that [Contractor] personnel are prohibited from entering the immediate vicinity of the crane during operation, unless prior approval has been obtained from the Corporate EHS Dept. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Total weight of the load will not exceed 50% of the rated capacity for the crane radius and configuration. ☐ Crane hooks will be moused or provided with safety latches. ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope (<1%) will be followed ☐ Counterweight swing radius will be barricaded. ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____ **Crane Hazards Comments:** _____ [Consultant/Engineer] personnel are prohibited from suspended personnel lifting.

ENVIRONMENTAL HAZARDS (NON CHEMICAL)

☒	☒ Heat Stress ☒ Cold Stress ☒ Insects, spiders, ticks ☐ Wild animals ☐ Mold, fungi ☐ Poisonous plants ☐ Hazardous noise	☒ Heat/Cold stress are monitored in accordance with [Consultant/Engineer] procedures ☒ Fluids are provided to prevent worker dehydration ☒ Types and injury potential of snakes, insects, spiders are reviewed with workers ☒ Insect repellant is used, PPE is used to protect against sting/bite injuries. ☐ All potentially poisonous plants such as poison ivy, poison oak, poison sumac are identified, long sleeve shirt or Tyvek is worn or a barrier cream is used when near these plants ☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) **Environmental Hazards Comments:** _____

POWER TOOLS, HAND TOOLS, and EXTENSION CORDS

☐	Eye injury, hand/arm cuts, electrical shock, strains, foot injuries, dust ☐ Grinders ☐ Needle Gun ☐ Chop saw ☐ Chain saw ☐ Trimmer ☐ Concrete/asphalt saw	☐ All tools and electrical cords will be inspected upon mobilization by: _____ ☐ All tools and electrical cords in-use will be inspected daily by: _____ ☐ Grinder speeds will not exceed grinding wheel ratings. ☐ Water or wet cutting performed to control dust ☐ Respirators used to prevent exposure to dust (respirator type: _____) ☐ Thorough utility survey conducted prior to any concrete cutting, coring ☐ Face shield and safety glasses used (required for all grinders, jackhammers, chain saws, etc.) ☐ Kevlar chaps and jacket (required for all chainsaw work) ☐ Hearing protection required for which tools or areas: _____ ☐ All extension cords are in good condition with no cuts through outer insulation, ground plugs are present, and no "vinyl tape" repairs. **Tool & Cord Comments:** _____

PRE-WORK THA

MANUAL MATERIAL HANDLING / MATERIAL STORAGE / HOUSEKEEPING

☐	Back or shoulder strain, struck by falling objects, trips and falls, incompatible materials (fire or explosion) ☐ Hvy manual lifting (>30 lbs) ☐ Chemical storage ☐ Compressed gas storage ☐ Tall storage greater than 2 pallets stacked. ☐ Material & equipment laydown areas ☐ Debris removal	☐ Mechanical lifting equipment used to reduce manual material handling: (☐ Forklift/Lull ☐ Heavy Equipment ☐ Chainfall ☐ _____) ☐ Manual lifting more than 50 lbs by a single person will be avoided. ☐ Good manual lifting techniques will be reviewed prior to site work. ☐ Incompatible chemicals will be separated by 20' ☐ Secondary containment will be provided for the following chemicals: _____ ☐ Safety equipment will be located near chemical storage. ☐ Spill Kit ☐ Emergency Shower ☐ Eyewash ☐ Drench Hose ☐ Splash PPE ☐ Flammable gases and oxygen will be separated by 20'. ☐ All compressed gas cylinders will be transported vertically and secured upright. ☐ Equipment and materials will not be stored on site ☐ Debris will be moved daily and placed in designated areas. **Material Handling & Housekeeping Comments:** _____

TRAFFIC & SIDEWALK OBSTRUCTION

☐	☐ Vehicle accidents ☐ Pedestrians struck by vehicles or heavy equipment ☐ Pedestrians falls ☐ Pedestrian struck-by falling objects	☐ DOT signal devices will be used to re-route vehicles around excavations or busy site entrances/exits that affect road traffic. ☐ Flaggers will be used and have DOT Flagger Training ☐ Pedestrian traffic will be safely routed around or over excavations. ☐ Pedestrian traffic will be safely routed around or under overhead work. **Traffic & Sidewalk Comments:** _____

HAZARDOUS WASTE SITE WORK

☒	☒ Exposure to hazardous vapors or dust, contact with contaminated materials, fire, and explosion. Contaminants of Concern and hazardous chemicals include: ☒ Volatile organic compounds (describe: BTEX) ☐ Semivolatile organic cmpds (describe: Coal tar and coal tar products) ☒ Metal dusts (describe arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, and zinc) ☒ PCBs ☐ Caustic (NaOH) ☐ Acid (H_2SO_4, HCl) ☒ Other hazardous waste site hazards are covered elsewhere in the HASP)	☒ Site workers with a potential for contact with contaminated materials will have OSHA 40-hour training, current 8-hour refresher, and medical exam. ☐ No intrusive work activities or areas are anticipated with current scope of work. Intrusive work activities include: _____ The perimeter of intrusive work areas are identified by: _____ Decontamination of personnel or equipment is not anticipated with the current scope of work. ☐ Decontamination of personnel and small tools will be conducted as follows: _____ ☐ Decontamination of heavy equipment will be conducted as follows: _____ ☐ Heavy equipment leaving the site will be inspected by: _____ ☐ Work area monitoring is not anticipated with the current scope of work. ☒ Work Area Air Monitoring as follows for (dust, VOCs, etc.) **OR** see attached. _____ to _____ Level C: Tyvek, boot covers, nitrile gloves, half or full face respirator with _____ cartridges changed daily _____ to _____ Level B: Same as above except supplied air respirator _____ to _____ STOP work, contact EHS Department ☐ Community Air Monitoring is not anticipated with the current scope of work. ☐ Community Air Monitoring is required per the attached document. **Comments/Other:** _____

PRE-WORK THA

EMERGENCY RESPONSE (911 Service is Available ☒ Yes ☐ No)			
Emergency Medical Treatment - Hospital Name: Hospital Address:	Brooklyn Hospital Center 121 DeKalb Avenue Brooklyn, New York 11205	**Phone:**	718-250-8000
Non-Emergency Med. Treatment - Clinic Name: Occupational Clinic Address:	Interfaith Medical Center 1545 Atlantic Avenue Brooklyn, New York 11213	**Phone:**	718-613-4988
Fire Department Name	New York Fire Department	**Phone:**	911
Spill Response:	New York Fire Department	**Phone:**	911
Client Representative Name::		**Office:**	
		Cell:	
[Consultant/Engineer] Project Manager Name:		**Office:**	
		Cell:	
[Consultant/Engineer] Corporate H&S Name:		**Office:**	
		Cell:	
Emergency Response Comments:			

Date:	
Project Name:	**Gowanus Canal Superfund Site**
THA Title:	**Work Near Water Task Hazard Analysis**
Subcontractor Name:	
[Consultant/Engineer] Representative (reviewed by):	
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO [CONTRACTOR] PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

PRE-WORK THA

THA Title:	**Work On Boats Task Hazard Analysis**	**Date:**	**18 February 2014**
Project Name:	**Gowanus Canal Superfund Site**	**Client Name:**	**National Grid**
Project Number:		**Client Project Manager:**	
Project Location:	**Brooklyn, New York**	**[Consultant/Engineer] Project Manager:**	
Scope of Work Summary:	The Pre-Design Work will involve work on boats/barges (i.e., collection of sediment core samples, delpoyment and retreival of sonar equipment, inspection of bulkheads and other Canal infrastructure, collection of surface water samples).		

Work Steps	**Process or Activity**	**Hazards**	**Hazard Control**
• Work on boats		• Work on boats	• A PFD must be worn by all personnel when working on boats • Whenever possible, vessels should have safety railings • Make yourself aware of the locations on the vessel of the rescue buoy, first aid kit, and fire extinguisher • To the maximum extent possible, stay seated while the vessel is in motion • Boat captain should communicate impending changes in direction or speed • Avoid trip hazards associated with boat anchor lines • Maintain good housekeeping practices on vessels
		• Boarding/disembarking boats	• Use three points of contact when boarding/disembarking vessels • Avoid carrying items that block your vision when boarding/dismbarking vessels (i.e., put the item down, board/disembark the vessel, then pick the item up) • Assist fellow field team members when boarding/dismbarking vessels • Avoid pinch points between vessels and bulkheads
•		•	•

Min. Personal Protective Equipment (PPE):	• Hardhat • Safety glasses • Gloves • Steel-toed/hard-toed boots • Hearing protection when working around loud noises • Traffic vest when working around vehicles or heavy equipment • Coast Guard-approved Personal Floatation Device (PFD) when working on or near water • Tyvek suits may be worn if desired to protect against getting contaminated water or sediment on clothing or skin

Individuals Must Sign the last page of this THA after review.

PRE-WORK THA

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
WALKING/WORKING SURFACES		
☒	☒ Uneven terrain ☒ Slippery surfaces	☒ Walkways are cleared of equipment, vegetation, excavated material, tools and debris ☐ Pits and floor openings are covered or otherwise guarded ☒ Work areas are illuminated adequately; field operations are not conducted before sunrise or after sunset unless adequate lighting is provided. ☐ Spills are cleaned up promptly ☐ Salt applied to icy areas, snow cleared from walkways
☐	LADDERS / STAIRS ☐ Extension Ladders ☐ Step Ladders ☐ Fixed Ladders ☐ Stairs	☐ Employees trained in safe ladder use at safety meeting ☐ Extension ladders are properly footed, secured at top, and setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity. **Ladders/Stairs Comments:** _____
☐	MANLIFT used to reach work ☐ Scissor Lift ☐ Extensible Boom ☐ Articulated Boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use. **Manlift Comments:** _____
WORKING ALONE		
☐	☐ Getting injured or incapacitated with no one else around to help ☐ Falling victim to crime	☐ Someone else knows your whereabouts, what you're doing and when you should be expected back to their office or project site location. This will be accomplished by communicating three (3) times at a minimum with the supervisor or the project manager 1 – Upon Arrival 2 – Midway through the day 3 – Upon Departure ☐ Ensure the area has wireless coverage; summon alternate communication method if wireless phones are not operable. ☐ Checked the weather forecast to avoid being caught up in bad weather conditions; ☐ Ensured that vehicle has sufficient fuel and is well maintained; ☐ Allowed self sufficient time for the trip so that you are not rushing; ☐ Drive with any bags, records and equipment hidden so that you are not seen hiding them as you park. **Working Alone Comments:** _____
EXCAVATIONS / TRENCHING/UNDERGROUND HAZARDS		
☐	☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. (specify below) ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard (specify below) ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Underground utilities have been identified and marked. ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ Hand digging within 3' of utility locations. ☐ Excavations are protected by perimeter fencing (not barricade tape): (☐ Rigid fence - chain link or wood, ☐ safety fence 6' from edge.) **Excavation Comments:** _____

PRE-WORK THA

CONFINED SPACES

☐	☐ No Serious Hazards ☐ Toxic atmosphere ☐ Carbon monoxide ☐ Hydrogen sulfide ☐ _____ ☐ Flammable atmosphere ☐ Low oxygen ☐ Combustible dust ☐ Other Serious Hazard: _____	☐ Confined space is altered so that it is no longer a confined space. (describe below) ☐ Confined space is downgraded to a non-permit confined space. (identify which spaces below) ☐ Alternate Entry is used. (Identify which space qualify for confined space entry below) ☐ Full permit-required confined space entry is used due to presence of serious hazards. ☐ Rescue team has been notified (☐ Paid FD ☐ Volunteer FD ☐ Plant Rescue) Rescue team: _____ Phone number: _____ ☐ All entrants and attendants for Alternate Entry and Permit-Required Entry have confined space entry training. **Confined Space Comments:** _____

BOAT OPERATIONS/WORKING ON or NEAR WATER and ICE

☒	☒ Drowning ☒ Hypothermia	☒ Only qualified employees are operating the boat ☒ Coast Guard-approved Personal Flotation Device (PFD), sized and adjusted to the wearer, is worn by all when involved in boat operations. ☒ A float plan is completed prior to leaving dock. ☒ Emergency equipment like ring buoy, flares and fire extinguishers are present **Boat, Water Operations Comments:** A PFD must be worn by all personnel when working on boats/barges. Whenever possible, vessels should have safety railings. Be careful when boarding or disembarking vessels - avoid carrying items that block your vision (i.e., put the item down, board/disembark the vessel, then pick the item up). Aid fellow field team members when boarding/disembarking vessels. Avoid trip hazards associated with boat anchor lines. Maintain good housekeeping practices on vessels.

DRILLING

☐	☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills	☐ Contractor inspected the drill rig ☐ High visibility vests, hard hats are being worn near the equipment ☐ Operators and helpers will maintain a safe distance to moving parts. All those working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ IDW is being managed as per regulations ☐ Area is surveyed for overhead utilities ☐ Hearing protection is used when working near the rig ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill Kit Located: _____ **Drilling operations Comments:** _____

HEAVY EQUIPMENT [other than cranes]

☐	☐ Max. safe slope for each vehicle will be followed ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Bulldozer ☐ Excavator ☐ Front Loader ☐ Mini Skid Steer (Bobcat) ☐ Mini Excavator ☐ Dump Truck ☐ Drill/Boring Rig ☐ Lull / Material Handler ☐ Forklift ☐ Manlift - specify type(s) ☐ Land Clearing loader	☐ Qualified persons operate all heavy equipment. (certificate is required for forklift and lull operators) ☐ Equipment will be inspected upon mobilization ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators will be reminded of seatbelt use by: _____ ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope for each vehicle will be followed ☐ Counterweight swing radius will be barricaded. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. Crane hook attachments will be used (specify): _____ ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____

PRE-WORK THA

CRANES

☐	☐ Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Wire rope failure – condition, loading, safety lines ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ _____ ☐ _____ ☐ _____	☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan will be developed and approved prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist will be completed and signed. ☐ A Critical Lift Checklist will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a discrete channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to winds exceeding 35mph. Hoisting equipment will be re-inspected and confirmed to be in operable condition prior to re-use. ☐ Cranes will not travel with personnel on the platform. Note that [Contractor] personnel are prohibited from entering the immediate vicinity of the crane during operation, unless prior approval has been obtained from the Corporate EHS Dept. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Total weight of the load will not exceed 50% of the rated capacity for the crane radius and configuration. ☐ Crane hooks will be moused or provided with safety latches. ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope (<1%) will be followed ☐ Counterweight swing radius will be barricaded. ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____ **Crane Hazards Comments:** _____ [Consultant/Engineer] personnel are prohibited from suspended personnel lifting.

ENVIRONMENTAL HAZARDS (NON CHEMICAL)

☒	☒ Heat Stress ☒ Cold Stress ☒ Insects, spiders, ticks ☐ Wild animals ☐ Mold, fungi ☐ Poisonous plants ☐ Hazardous noise	☒ Heat/Cold stress are monitored in accordance with [Consultant/Engineer] procedures ☒ Fluids are provided to prevent worker dehydration ☒ Types and injury potential of snakes, insects, spiders are reviewed with workers ☒ Insect repellant is used, PPE is used to protect against sting/bite injuries. ☐ All potentially poisonous plants such as poison ivy, poison oak, poison sumac are identified, long sleeve shirt or Tyvek is worn or a barrier cream is used when near these plants ☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) **Environmental Hazards Comments:** _____

POWER TOOLS, HAND TOOLS, and EXTENSION CORDS

☐	Eye injury, hand/arm cuts, electrical shock, strains, foot injuries, dust ☐ Grinders ☐ Needle Gun ☐ Chop saw ☐ Chain saw ☐ Trimmer ☐ Concrete/asphalt saw	☐ All tools and electrical cords will be inspected upon mobilization by: _____ ☐ All tools and electrical cords in-use will be inspected daily by: _____ ☐ Grinder speeds will not exceed grinding wheel ratings. ☐ Water or wet cutting performed to control dust ☐ Respirators used to prevent exposure to dust (respirator type: _____) ☐ Thorough utility survey conducted prior to any concrete cutting, coring ☐ Face shield and safety glasses used (required for all grinders, jackhammers, chain saws, etc.) ☐ Kevlar chaps and jacket (required for all chainsaw work) ☐ Hearing protection required for which tools or areas: _____ ☐ All extension cords are in good condition with no cuts through outer insulation, ground plugs are present, and no "vinyl tape" repairs. **Tool & Cord Comments:** _____

PRE-WORK THA

MANUAL MATERIAL HANDLING / MATERIAL STORAGE / HOUSEKEEPING

☒	Back or shoulder strain, struck by falling objects, trips and falls, incompatible materials (fire or explosion) ☒ Hvy manual lifting (>30 lbs) ☐ Chemical storage ☐ Compressed gas storage ☐ Tall storage greater than 2 pallets stacked. ☐ Material & equipment laydown areas ☐ Debris removal	☒ Mechanical lifting equipment used to reduce manual material handling: (☐ Forklift/Lull ☐ Heavy Equipment ☐ Chainfall ☐ _____) ☒ Manual lifting more than 50 lbs by a single person will be avoided. ☒ Good manual lifting techniques will be reviewed prior to site work. ☐ Incompatible chemicals will be separated by 20' ☐ Secondary containment will be provided for the following chemicals: _____ ☐ Safety equipment will be located near chemical storage. ☐ Spill Kit ☐ Emergency Shower ☐ Eyewash ☐ Drench Hose ☐ Splash PPE ☐ Flammable gases and oxygen will be separated by 20'. ☐ All compressed gas cylinders will be transported vertically and secured upright. ☐ Equipment and materials will not be stored on site ☐ Debris will be moved daily and placed in designated areas. **Material Handling & Housekeeping Comments:** _____

TRAFFIC & SIDEWALK OBSTRUCTION

☐	☐ Vehicle accidents ☐ Pedestrians struck by vehicles or heavy equipment ☐ Pedestrians falls ☐ Pedestrian struck-by falling objects	☐ DOT signal devices will be used to re-route vehicles around excavations or busy site entrances/exits that affect road traffic. ☐ Flaggers will be used and have DOT Flagger Training ☐ Pedestrian traffic will be safely routed around or over excavations. ☐ Pedestrian traffic will be safely routed around or under overhead work. **Traffic & Sidewalk Comments:** _____

HAZARDOUS WASTE SITE WORK

☒	☒ Exposure to hazardous vapors or dust, contact with contaminated materials, fire, and explosion. Contaminants of Concern and hazardous chemicals include: ☒ Volatile organic compounds (describe: BTEX) ☒ Semivolatile organic cmpds (describe: Coal tar and coal tar products) ☒ Metal dusts (describe arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, and zinc) ☒ PCBs ☐ Caustic (NaOH) ☐ Acid (H_2SO_4, HCl) ☒ Other hazardous waste site hazards are covered elsewhere in the HASP)	☒ Site workers with a potential for contact with contaminated materials will have OSHA 40-hour training, current 8-hour refresher, and medical exam. ☐ No intrusive work activities or areas are anticipated with current scope of work. Intrusive work activities include: _____ The perimeter of intrusive work areas are identified by: _____ Decontamination of personnel or equipment is not anticipated with the current scope of work. ☐ Decontamination of personnel and small tools will be conducted as follows: _____ ☐ Decontamination of heavy equipment will be conducted as follows: _____ ☐ Heavy equipment leaving the site will be inspected by: _____ ☐ Work area monitoring is not anticipated with the current scope of work. ☒ Work Area Air Monitoring as follows for (dust, VOCs, etc.) **OR** see attached. _____ to _____ Level C: Tyvek, boot covers, nitrile gloves, half or full face respirator with _____ cartridges changed daily _____ to _____ Level B: Same as above except supplied air respirator _____ to _____ STOP work, contact EHS Department ☐ Community Air Monitoring is not anticipated with the current scope of work. ☐ Community Air Monitoring is required per the attached document. **Comments/Other:** _____

PRE-WORK THA

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)**			
Emergency Medical Treatment - Hospital Name: Hospital Address:	Brooklyn Hospital Center 121 DeKalb Avenue Brooklyn, New York 11205	**Phone:**	718-250-8000
Non-Emergency Med. Treatment - Clinic Name: Occupational Clinic Address:	Interfaith Medical Center 1545 Atlantic Avenue Brooklyn, New York 11213	**Phone:**	718-613-4988
Fire Department Name	New York Fire Department	**Phone:**	911
Spill Response:	New York Fire Department	**Phone:**	911
Client Representative Name::		**Office:**	
		Cell:	
[Consultant/Engineer] Project Manager Name:		**Office:**	
		Cell:	
[Consultant/Engineer] Corporate H&S Name:		**Office:**	
		Cell:	
Emergency Response Comments:			

Date:	
Project Name:	**Gowanus Canal Superfund Site**
THA Title:	**Work On Boats Task Hazard Analysis**
Subcontractor Name:	
[Consultant/Engineer] Representative (reviewed by):	
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO [CONTRACTOR] PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

PRE-WORK THA

THA Title:	**Sediment Core Collection & Monitoring Equipment Deployment and Retrieval Task Hazard Analysis**	**Date:**	**27 February 2014**
Project Name:	**Gowanus Canal Superfund Site**	**Client Name:**	**National Grid**
Project Number:		**Client Project Manager:**	
Project Location:	**Brooklyn, New York**	**[Consultant/Engineer] Project Manager:**	
Scope of Work Summary:	The Pre-Design Work will involve the collection of sediment core samples and the delpoyment and retreival of monitoring equipment from barges/boats on the Gowanus Canal.		

Work Steps	**Process or Activity**	**Hazards**	**Hazard Control**
• Sediment core collection from boats/barges		• Working around core sample collection equipment	• Avoid pinch points that occur when the mast used to deploy the core samplers is raised or lowered • Stay away from the sample collection apparatus when in use • Avoid the sample collection floor opening at all times • Avoid trip hazards associated with boat anchor lines • Wear hearing protection during Vibracore use • Use multiple persons or mechanical assistance to lift heavy loads • Wear gloves to protect against contact with contaminated sediment
		• Exposure to contaminated sediment/soil and volatile organic compound vapors	• Perform air monitoring using a PID and dust monitor (see HASP for action levels)
• Deployment/retrieval of monitoring equipment from boats/barges		• Deploying and retrieving potentially heavy/bulky equipment	• Use caution when deploying/retrieving equipment and do not put yourself in a position where you are in danger of falling overboard • Use multiple persons or mechanical assistance to lift heavy loads • Avoid trip hazard associated with boat anchor lines • Wear gloves to protect against contact with contaminated water
•		•	•

Min. Personal Protective Equipment (PPE):	• Hardhat • Safety glasses • Gloves • Steel-toed/hard-toed boots • Hearing protection when working around loud noises • Traffic vest when working around vehicles or heavy equipment • Coast Guard-approved Personal Floatation Device (PFD) when working on or near water • Tyvek suits may be worn if desired to protect against getting contaminated water or sediment on clothing or skin

Individuals Must Sign the last page of this THA after review.

PRE-WORK THA

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
WALKING/WORKING SURFACES		
☒	☒ Uneven terrain ☒ Slippery surfaces	☒ Walkways are cleared of equipment, vegetation, excavated material, tools and debris ☐ Pits and floor openings are covered or otherwise guarded ☒ Work areas are illuminated adequately; field operations are not conducted before sunrise or after sunset unless adequate lighting is provided. ☐ Spills are cleaned up promptly ☐ Salt applied to icy areas, snow cleared from walkways
☐	LADDERS / STAIRS ☐ Extension Ladders ☐ Step Ladders ☐ Fixed Ladders ☐ Stairs	☐ Employees trained in safe ladder use at safety meeting ☐ Extension ladders are properly footed, secured at top, and setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity. **Ladders/Stairs Comments:** _____
☐	MANLIFT used to reach work ☐ Scissor Lift ☐ Extensible Boom ☐ Articulated Boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use. **Manlift Comments:** _____
WORKING ALONE		
☐	☐ Getting injured or incapacitated with no one else around to help ☐ Falling victim to crime	☐ Someone else knows your whereabouts, what you're doing and when you should be expected back to their office or project site location. This will be accomplished by communicating three (3) times at a minimum with the supervisor or the project manager 1 – Upon Arrival 2 – Midway through the day 3 – Upon Departure ☐ Ensure the area has wireless coverage; summon alternate communication method if wireless phones are not operable. ☐ Checked the weather forecast to avoid being caught up in bad weather conditions; ☐ Ensured that vehicle has sufficient fuel and is well maintained; ☐ Allowed self sufficient time for the trip so that you are not rushing; ☐ Drive with any bags, records and equipment hidden so that you are not seen hiding them as you park. **Working Alone Comments:** _____
EXCAVATIONS / TRENCHING/UNDERGROUND HAZARDS		
☐	☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. (specify below) ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard (specify below) ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Underground utilities have been identified and marked. ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ Hand digging within 3' of utility locations. ☐ Excavations are protected by perimeter fencing (not barricade tape): (☐ Rigid fence - chain link or wood, ☐ safety fence 6' from edge.) **Excavation Comments:** _____

PRE-WORK THA

CONFINED SPACES		
☐	☐ No Serious Hazards ☐ Toxic atmosphere ☐ Carbon monoxide ☐ Hydrogen sulfide ☐ _____ ☐ Flammable atmosphere ☐ Low oxygen ☐ Combustible dust ☐ Other Serious Hazard: _____	☐ Confined space is altered so that it is no longer a confined space. (describe below) ☐ Confined space is downgraded to a non-permit confined space. (identify which spaces below) ☐ Alternate Entry is used. (Identify which space qualify for confined space entry below) ☐ Full permit-required confined space entry is used due to presence of serious hazards. ☐ Rescue team has been notified (☐ Paid FD ☐ Volunteer FD ☐ Plant Rescue) Rescue team: _____ Phone number: _____ ☐ All entrants and attendants for Alternate Entry and Permit-Required Entry have confined space entry training. **Confined Space Comments:** _____
BOAT OPERATIONS/WORKING ON or NEAR WATER and ICE		
☒	☒ Drowning ☒ Hypothermia	☒ Only qualified employees are operating the boat ☒ Coast Guard-approved Personal Flotation Device (PFD), sized and adjusted to the wearer, is worn by all when involved in boat operations. ☒ A float plan is completed prior to leaving dock. ☒ Emergency equipment like ring buoy, flares and fire extinguishers are present **Boat, Water Operations Comments:** A PFD must be worn by all personnel when working on boats/barges. Whenever possible, vessels should have safety railings. Be careful when boarding or disembarking vessels - avoid carrying items that block your vision (i.e., put the item down, board/disembark the vessel, then pick the item up). Aid fellow field team members when boarding/disembarking vessels. Avoid pinch points between vessel and bulkheads.
DRILLING		
☐	☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills	☐ Contractor inspected the drill rig ☐ High visibility vests, hard hats are being worn near the equipment ☐ Operators and helpers will maintain a safe distance to moving parts. All those working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ IDW is being managed as per regulations ☐ Area is surveyed for overhead utilities ☐ Hearing protection is used when working near the rig ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill Kit Located: _____ **Drilling operations Comments:** _____
HEAVY EQUIPMENT [other than cranes]		
☐	☐ Max. safe slope for each vehicle will be followed ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Bulldozer ☐ Excavator ☐ Front Loader ☐ Mini Skid Steer (Bobcat) ☐ Mini Excavator ☐ Dump Truck ☐ Drill/Boring Rig ☐ Lull / Material Handler ☐ Forklift ☐ Manlift - specify type(s) ☐ Land Clearing loader	☐ Qualified persons operate all heavy equipment. (certificate is required for forklift and lull operators) ☐ Equipment will be inspected upon mobilization ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators will be reminded of seatbelt use by: _____ ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope for each vehicle will be followed ☐ Counterweight swing radius will be barricaded. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. Crane hook attachments will be used (specify): _____ ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____

PRE-WORK THA

CRANES

☒

- ☒ Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment
- ☒ Overbalancing – high winds, outrigger placement, overloading, safe slope
- ☒ Wire rope failure – condition, loading, safety lines
- ☒ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks
- ☐ _____
- ☐ _____
- ☐ _____

- ☒ Only qualified persons operate cranes (certificate required).
- ☐ A Critical Lift Plan will be developed and approved prior to mobilization.
- ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist will be completed and signed.
- ☐ A Critical Lift Checklist will be completed and signed prior to crane mobilization.
- ☒ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis.
- ☒ Crane operator will remain at the controls at all times during operation.
- ☒ Crane operation must be performed under the direction of an appointed signal person at all times.
- ☒ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a discrete channel.
- ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall.
- ☒ Stop work will be issued whenever hoisting equipment is exposed to winds exceeding 35mph. Hoisting equipment will be re-inspected and confirmed to be in operable condition prior to re-use.
- ☒ Cranes will not travel with personnel on the platform. Note that [Contractor] personnel are prohibited from entering the immediate vicinity of the crane during operation, unless prior approval has been obtained from the Corporate EHS Dept.
- ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%).
- ☒ Total weight of the load will not exceed 50% of the rated capacity for the crane radius and configuration.
- ☐ Crane hooks will be moused or provided with safety latches.
- ☒ Eye contact with the operator is made prior to approaching near equipment or swing radius
- ☐ High visibility vests are required
- ☐ Max. safe slope (<1%) will be followed
- ☐ Counterweight swing radius will be barricaded.
- ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____

Crane Hazards Comments: A winch mounted on a derrick on a barge will be used to raise and lower sediment samples, and may possibly be used to deploy and retrieve monitoring equipment. The hazards presented by the derrick and winch setup are similar to those presented by a crane.

[Consultant/Engineer] personnel are prohibited from suspended personnel lifting.

ENVIRONMENTAL HAZARDS (NON CHEMICAL)

☒

- ☒ Heat Stress
- ☒ Cold Stress
- ☒ Insects, spiders, ticks
- ☐ Wild animals
- ☐ Mold, fungi
- ☐ Poisonous plants
- ☐ Hazardous noise

- ☒ Heat/Cold stress are monitored in accordance with [Consultant/Engineer] procedures
- ☒ Fluids are provided to prevent worker dehydration
- ☒ Types and injury potential of snakes, insects, spiders are reviewed with workers
- ☒ Insect repellant is used, PPE is used to protect against sting/bite injuries.
- ☐ All potentially poisonous plants such as poison ivy, poison oak, poison sumac are identified, long sleeve shirt or Tyvek is worn or a barrier cream is used when near these plants
- ☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period)

Environmental Hazards Comments: _____

POWER TOOLS, HAND TOOLS, and EXTENSION CORDS

☐

Eye injury, hand/arm cuts, electrical shock, strains, foot injuries, dust

- ☐ Grinders
- ☐ Needle Gun
- ☐ Chop saw
- ☐ Chain saw
- ☐ Trimmer
- ☐ Concrete/asphalt saw

- ☐ All tools and electrical cords will be inspected upon mobilization by: _____
- ☐ All tools and electrical cords in-use will be inspected daily by: _____
- ☐ Grinder speeds will not exceed grinding wheel ratings.
- ☐ Water or wet cutting performed to control dust
- ☐ Respirators used to prevent exposure to dust (respirator type: _____)
- ☐ Thorough utility survey conducted prior to any concrete cutting, coring
- ☐ Face shield and safety glasses used (required for all grinders, jackhammers, chain saws, etc.)
- ☐ Kevlar chaps and jacket (required for all chainsaw work)
- ☐ Hearing protection required for which tools or areas: _____
- ☐ All extension cords are in good condition with no cuts through outer insulation, ground plugs are present, and no "vinyl tape" repairs.

Tool & Cord Comments: _____

PRE-WORK THA

MANUAL MATERIAL HANDLING / MATERIAL STORAGE / HOUSEKEEPING

☒	Back or shoulder strain, struck by falling objects, trips and falls, incompatible materials (fire or explosion) ☒ Hvy manual lifting (>30 lbs) ☐ Chemical storage ☐ Compressed gas storage ☐ Tall storage greater than 2 pallets stacked. ☐ Material & equipment laydown areas ☐ Debris removal	☒ Mechanical lifting equipment used to reduce manual material handling: (☐ Forklift/Lull ☐ Heavy Equipment ☐ Chainfall ☐ _____) ☒ Manual lifting more than 50 lbs by a single person will be avoided. ☒ Good manual lifting techniques will be reviewed prior to site work. ☐ Incompatible chemicals will be separated by 20' ☐ Secondary containment will be provided for the following chemicals: _____ ☐ Safety equipment will be located near chemical storage. ☐ Spill Kit ☐ Emergency Shower ☐ Eyewash ☐ Drench Hose ☐ Splash PPE ☐ Flammable gases and oxygen will be separated by 20'. ☐ All compressed gas cylinders will be transported vertically and secured upright. ☐ Equipment and materials will not be stored on site ☐ Debris will be moved daily and placed in designated areas. **Material Handling & Housekeeping Comments:** _____

TRAFFIC & SIDEWALK OBSTRUCTION

☐	☐ Vehicle accidents ☐ Pedestrians struck by vehicles or heavy equipment ☐ Pedestrians falls ☐ Pedestrian struck-by falling objects	☐ DOT signal devices will be used to re-route vehicles around excavations or busy site entrances/exits that affect road traffic. ☐ Flaggers will be used and have DOT Flagger Training ☐ Pedestrian traffic will be safely routed around or over excavations. ☐ Pedestrian traffic will be safely routed around or under overhead work. **Traffic & Sidewalk Comments:** _____

HAZARDOUS WASTE SITE WORK

☒	☒ Exposure to hazardous vapors or dust, contact with contaminated materials, fire, and explosion. Contaminants of Concern and hazardous chemicals include: ☒ Volatile organic compounds (describe: BTEX) ☒ Semivolatile organic cmpds (describe: Coal tar and coal tar products) ☒ Metal dusts (describe arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, and zinc) ☒ PCBs ☐ Caustic (NaOH) ☐ Acid (H_2SO_4, HCl) ☒ Other hazardous waste site hazards are covered elsewhere in the HASP)	☒ Site workers with a potential for contact with contaminated materials will have OSHA 40-hour training, current 8-hour refresher, and medical exam. ☐ No intrusive work activities or areas are anticipated with current scope of work. Intrusive work activities include: _____ The perimeter of intrusive work areas are identified by: _____ Decontamination of personnel or equipment is not anticipated with the current scope of work. ☐ Decontamination of personnel and small tools will be conducted as follows: _____ ☐ Decontamination of heavy equipment will be conducted as follows: _____ ☐ Heavy equipment leaving the site will be inspected by: _____ ☐ Work area monitoring is not anticipated with the current scope of work. ☒ Work Area Air Monitoring as follows for (dust, VOCs, etc.) **OR** see attached. _____ to _____ Level C: Tyvek, boot covers, nitrile gloves, half or full face respirator with _____ cartridges changed daily _____ to _____ Level B: Same as above except supplied air respirator _____ to _____ STOP work, contact EHS Department ☐ Community Air Monitoring is not anticipated with the current scope of work. ☐ Community Air Monitoring is required per the attached document. **Comments/Other:** _____

PRE-WORK THA

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)**			
Emergency Medical Treatment - Hospital Name: Hospital Address:	Brooklyn Hospital Center 121 DeKalb Avenue Brooklyn, New York 11205	**Phone:**	718-250-8000
Non-Emergency Med. Treatment - Clinic Name: Occupational Clinic Address:	Interfaith Medical Center 1545 Atlantic Avenue Brooklyn, New York 11213	**Phone:**	718-613-4988
Fire Department Name	New York Fire Department	**Phone:**	911
Spill Response:	New York Fire Department	**Phone:**	911
Client Representative Name::		**Office:**	
		Cell:	
[Consultant/Engineer] Project Manager Name:		**Office:**	
		Cell:	
[Consultant/Engineer] Corporate H&S Name:		**Office:**	
		Cell:	
Emergency Response Comments:			

Date:	
Project Name:	**Gowanus Canal Superfund Site**
THA Title:	**Sediment Core Collection & Monitoring Equipment Deployment and Retrieval Task Hazard Analysis**
Subcontractor Name:	
[Consultant/Engineer] Representative (reviewed by):	
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO [CONTRACTOR] PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

PRE-WORK THA

THA Title:	**Work Around Heavy Equipment Task Hazard Analysis**	**Date:**	**27 February 2014**
Project Name:	**Gowanus Canal Superfund Site**	**Client Name:**	**National Grid**
Project Number:		**Client Project Manager:**	
Project Location:	**Brooklyn, New York**	**[Consultant/Engineer] Project Manager:**	
Scope of Work Summary:	As part of the Pre-Design Work, drill rigs will be employed at landside locations to collected soil cores.		

Work Steps	**Process or Activity**	**Hazards**	**Hazard Control**
• Collection of soil cores using a drill rig		• Work around heavy equipment	• Only qualfied personnel will operate drill rigs • The rule of only ever having one person's hands on the drill at a time (operator or helper) will be observed • All personnel working around drill rigs should make themselves aware of the locations of the emergency stop buttons • Hearing protection will be worn when the drill rig is in operation • High visibility vests and hardhats will be worn by all personnel when working around drill rigs
		• Overhead hazards	• Overhead hazards will be noted and avoided • Drill rigs will only be moved with masts lowered
		• Underground hazards	• Efforts will be made to determine the locations of subsurface utilities and other obstacles (e.g., DigSafe, geophysical survey) before drilling operations commence in any one area
•		•	•

Min. Personal Protective Equipment (PPE):	• Hardhat • Safety glasses • Gloves • Steel-toed/hard-toed boots • Hearing protection when working around loud noises • Traffic vest when working around vehicles or heavy equipment • Coast Guard-approved Personal Floatation Device (PFD) when working on or near water • Tyvek suits may be worn if desired to protect against getting contaminated water or sediment on clothing or skin

Individuals Must Sign the last page of this THA after review.

PRE-WORK THA

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
WALKING/WORKING SURFACES		
☒	☒ Uneven terrain ☒ Slippery surfaces	☒ Walkways are cleared of equipment, vegetation, excavated material, tools and debris ☒ Pits and floor openings are covered or otherwise guarded ☒ Work areas are illuminated adequately; field operations are not conducted before sunrise or after sunset unless adequate lighting is provided. ☒ Spills are cleaned up promptly ☒ Salt applied to icy areas, snow cleared from walkways
☐	LADDERS / STAIRS ☐ Extension Ladders ☐ Step Ladders ☐ Fixed Ladders ☐ Stairs	☐ Employees trained in safe ladder use at safety meeting ☐ Extension ladders are properly footed, secured at top, and setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity. **Ladders/Stairs Comments:** _____
☐	MANLIFT used to reach work ☐ Scissor Lift ☐ Extensible Boom ☐ Articulated Boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use. **Manlift Comments:** _____
WORKING ALONE		
☐	☐ Getting injured or incapacitated with no one else around to help ☐ Falling victim to crime	☐ Someone else knows your whereabouts, what you're doing and when you should be expected back to their office or project site location. This will be accomplished by communicating three (3) times at a minimum with the supervisor or the project manager 1 – Upon Arrival 2 – Midway through the day 3 – Upon Departure ☐ Ensure the area has wireless coverage; summon alternate communication method if wireless phones are not operable. ☐ Checked the weather forecast to avoid being caught up in bad weather conditions; ☐ Ensured that vehicle has sufficient fuel and is well maintained; ☐ Allowed self sufficient time for the trip so that you are not rushing; ☐ Drive with any bags, records and equipment hidden so that you are not seen hiding them as you park. **Working Alone Comments:** _____
EXCAVATIONS / TRENCHING/UNDERGROUND HAZARDS		
☐	☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. (specify below) ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard (specify below) ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Underground utilities have been identified and marked. ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ Hand digging within 3' of utility locations. ☐ Excavations are protected by perimeter fencing (not barricade tape): (☐ Rigid fence - chain link or wood, ☐ safety fence 6' from edge.) **Excavation Comments:** _____

PRE-WORK THA

CONFINED SPACES		
☐	☐ No Serious Hazards ☐ Toxic atmosphere ☐ Carbon monoxide ☐ Hydrogen sulfide ☐ _____ ☐ Flammable atmosphere ☐ Low oxygen ☐ Combustible dust ☐ Other Serious Hazard: _____	☐ Confined space is altered so that it is no longer a confined space. (describe below) ☐ Confined space is downgraded to a non-permit confined space. (identify which spaces below) ☐ Alternate Entry is used. (Identify which space qualify for confined space entry below) ☐ Full permit-required confined space entry is used due to presence of serious hazards. ☐ Rescue team has been notified (☐ Paid FD ☐ Volunteer FD ☐ Plant Rescue) Rescue team: _____ Phone number: _____ ☐ All entrants and attendants for Alternate Entry and Permit-Required Entry have confined space entry training. **Confined Space Comments:** _____
BOAT OPERATIONS/WORKING ON or NEAR WATER and ICE		
☐	☐ Drowning ☐ Hypothermia	☐ Only qualified employees are operating the boat ☐ Coast Guard-approved Personal Flotation Device (PFD), sized and adjusted to the wearer, is worn by all when involved in boat operations. ☐ A float plan is completed prior to leaving dock. ☐ Emergency equipment like ring buoy, flares and fire extinguishers are present **Boat, Water Operations Comments:** _____
DRILLING		
☒	☒ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☒ Underground utilities, aboveground ☒ Spills	☒ Contractor inspected the drill rig ☒ High visibility vests, hard hats are being worn near the equipment ☒ Operators and helpers will maintain a safe distance to moving parts. All those working near moving or rotating parts will secure loose hair, clothing, and equipment. ☒ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☒ Max. safe slope for rig will be followed ☒ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig ☒ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☒ IDW is being managed as per regulations ☒ Area is surveyed for overhead utilities ☒ Hearing protection is used when working near the rig ☒ Spill equipment is available for fuel and hydraulic fluid leaks. Spill Kit Located: _____ **Drilling Operations Comments:** _____
HEAVY EQUIPMENT [other than cranes]		
☒	☐ Max. safe slope for each vehicle will be followed ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Bulldozer ☐ Excavator ☐ Front Loader ☐ Mini Skid Steer (Bobcat) ☐ Mini Excavator ☐ Dump Truck ☒ Drill/Boring Rig ☐ Lull / Material Handler ☐ Forklift ☐ Manlift - specify type(s) ☐ Land Clearing loader	☒ Qualified persons operate all heavy equipment. (certificate is required for forklift and lull operators) ☒ Equipment will be inspected upon mobilization ☒ All leaks or defective safety equipment will be repaired before use. ☐ Operators will be reminded of seatbelt use by: _____ ☒ Eye contact with the operator is made prior to approaching near equipment or swing radius ☒ High visibility vests are required ☒ Max. safe slope for each vehicle will be followed ☐ Counterweight swing radius will be barricaded. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. Crane hook attachments will be used (specify): _____ ☒ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____

PRE-WORK THA

CRANES

☐	☐ Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Wire rope failure – condition, loading, safety lines ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ _____ ☐ _____ ☐ _____	☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan will be developed and approved prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist will be completed and signed. ☐ A Critical Lift Checklist will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a discrete channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to winds exceeding 35mph. Hoisting equipment will be re-inspected and confirmed to be in operable condition prior to re-use. ☐ Cranes will not travel with personnel on the platform. Note that [Contractor] personnel are prohibited from entering the immediate vicinity of the crane during operation, unless prior approval has been obtained from the Corporate EHS Dept. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Total weight of the load will not exceed 50% of the rated capacity for the crane radius and configuration. ☐ Crane hooks will be moused or provided with safety latches. ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope (<1%) will be followed ☐ Counterweight swing radius will be barricaded. ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____ **Crane Hazards Comments:** _____ [Consultant/Engineer] personnel are prohibited from suspended personnel lifting.

ENVIRONMENTAL HAZARDS (NON CHEMICAL)

☐	☐ Heat Stress ☐ Cold Stress ☐ Insects, spiders, ticks ☐ Wild animals ☐ Mold, fungi ☐ Poisonous plants ☐ Hazardous noise	☐ Heat/Cold stress are monitored in accordance with [Consultant/Engineer] procedures ☐ Fluids are provided to prevent worker dehydration ☐ Types and injury potential of snakes, insects, spiders are reviewed with workers ☐ Insect repellant is used, PPE is used to protect against sting/bite injuries. ☐ All potentially poisonous plants such as poison ivy, poison oak, poison sumac are identified, long sleeve shirt or Tyvek is worn or a barrier cream is used when near these plants ☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) **Environmental Hazards Comments:** _____

POWER TOOLS, HAND TOOLS, and EXTENSION CORDS

☐	Eye injury, hand/arm cuts, electrical shock, strains, foot injuries, dust ☐ Grinders ☐ Needle Gun ☐ Chop saw ☐ Chain saw ☐ Trimmer ☐ Concrete/asphalt saw	☐ All tools and electrical cords will be inspected upon mobilization by: _____ ☐ All tools and electrical cords in-use will be inspected daily by: _____ ☐ Grinder speeds will not exceed grinding wheel ratings. ☐ Water or wet cutting performed to control dust ☐ Respirators used to prevent exposure to dust (respirator type: _____) ☐ Thorough utility survey conducted prior to any concrete cutting, coring ☐ Face shield and safety glasses used (required for all grinders, jackhammers, chain saws, etc.) ☐ Kevlar chaps and jacket (required for all chainsaw work) ☐ Hearing protection required for which tools or areas: _____ ☐ All extension cords are in good condition with no cuts through outer insulation, ground plugs are present, and no "vinyl tape" repairs. **Tool & Cord Comments:** _____

PRE-WORK THA

MANUAL MATERIAL HANDLING / MATERIAL STORAGE / HOUSEKEEPING

☒	Back or shoulder strain, struck by falling objects, trips and falls, incompatible materials (fire or explosion) ☒ Hvy manual lifting (>30 lbs) ☐ Chemical storage ☐ Compressed gas storage ☐ Tall storage greater than 2 pallets stacked. ☒ Material & equipment laydown areas ☒ Debris removal	☒ Mechanical lifting equipment used to reduce manual material handling: (☐ Forklift/Lull ☐ Heavy Equipment ☐ Chainfall ☐ _____) ☒ Manual lifting more than 50 lbs by a single person will be avoided. ☒ Good manual lifting techniques will be reviewed prior to site work. ☐ Incompatible chemicals will be separated by 20' ☐ Secondary containment will be provided for the following chemicals: _____ ☐ Safety equipment will be located near chemical storage. ☐ Spill Kit ☐ Emergency Shower ☐ Eyewash ☐ Drench Hose ☐ Splash PPE ☐ Flammable gases and oxygen will be separated by 20'. ☐ All compressed gas cylinders will be transported vertically and secured upright. ☐ Equipment and materials will not be stored on site ☐ Debris will be moved daily and placed in designated areas. **Material Handling & Housekeeping Comments:** _____

TRAFFIC & SIDEWALK OBSTRUCTION

☐	☐ Vehicle accidents ☐ Pedestrians struck by vehicles or heavy equipment ☐ Pedestrians falls ☐ Pedestrian struck-by falling objects	☐ DOT signal devices will be used to re-route vehicles around excavations or busy site entrances/exits that affect road traffic. ☐ Flaggers will be used and have DOT Flagger Training ☐ Pedestrian traffic will be safely routed around or over excavations. ☐ Pedestrian traffic will be safely routed around or under overhead work. **Traffic & Sidewalk Comments:** _____

HAZARDOUS WASTE SITE WORK

☒	☒ Exposure to hazardous vapors or dust, contact with contaminated materials, fire, and explosion. Contaminants of Concern and hazardous chemicals include: ☒ Volatile organic compounds (describe: BTEX) ☒ Semivolatile organic cmpds (describe: Coal tar and coal tar products) ☒ Metal dusts (describe arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, and zinc) ☒ PCBs ☐ Caustic (NaOH) ☐ Acid (H_2SO_4, HCl) ☒ Other hazardous waste site hazards are covered elsewhere in the HASP)	☒ Site workers with a potential for contact with contaminated materials will have OSHA 40-hour training, current 8-hour refresher, and medical exam. ☐ No intrusive work activities or areas are anticipated with current scope of work. Intrusive work activities include: _____ The perimeter of intrusive work areas are identified by: _____ Decontamination of personnel or equipment is not anticipated with the current scope of work. ☐ Decontamination of personnel and small tools will be conducted as follows: _____ ☐ Decontamination of heavy equipment will be conducted as follows: _____ ☐ Heavy equipment leaving the site will be inspected by: _____ ☐ Work area monitoring is not anticipated with the current scope of work. ☒ Work Area Air Monitoring as follows for (dust, VOCs, etc.) **OR** see attached. _____ to _____ Level C: Tyvek, boot covers, nitrile gloves, half or full face respirator with _____ cartridges changed daily _____ to _____ Level B: Same as above except supplied air respirator _____ to _____ STOP work, contact EHS Department ☐ Community Air Monitoring is not anticipated with the current scope of work. ☐ Community Air Monitoring is required per the attached document. **Comments/Other:** _____

PRE-WORK THA

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)**			
Emergency Medical Treatment - Hospital Name: Hospital Address:	Brooklyn Hospital Center 121 DeKalb Avenue Brooklyn, New York 11205	**Phone:**	718-250-8000
Non-Emergency Med. Treatment - Clinic Name: Occupational Clinic Address:	Interfaith Medical Center 1545 Atlantic Avenue Brooklyn, New York 11213	**Phone:**	718-613-4988
Fire Department Name	New York Fire Department	**Phone:**	911
Spill Response:	New York Fire Department	**Phone:**	911
Client Representative Name::		**Office:**	
		Cell:	
[Consultant/Engineer] Project Manager Name:		**Office:**	
		Cell:	
[Consultant/Engineer] Corporate H&S Name:		**Office:**	
		Cell:	
Emergency Response Comments:			

Date:	
Project Name:	**Gowanus Canal Superfund Site**
THA Title:	**Work Around Heavy Equipment Task Hazard Analysis**
Subcontractor Name:	
[Consultant/Engineer] Representative (reviewed by):	
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO [CONTRACTOR] PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

PRE-WORK THA

THA Title:	**Sediment & Soil Core Logging and Sampling Task Hazard Analysis**	**Date:**	**17 February 2014**
Project Name:	**Gowanus Canal Superfund Site**	**Client Name:**	**National Grid**
Project Number:		**Client Project Manager:**	
Project Location:	**Brooklyn, New York**	**[Consultant/Engineer] Project Manager:**	
Scope of Work Summary:	As part of the Pre-Design Work, sediment cores will be obtained from locations within the Gowanus Canal using barge mounted sampling equipment, and soil cores will be obtained from landside locations along the Canal using drill rigs. Following their collection, these sediment and soil cores will be transported to landside core processing locations for logging and sampling. The hazards associated with working on barges, with sediment core collection on barges, and with working around drill rigs and soil core collection are covered in other THAs. In this THA, only the hazards associated with sediment/soil core processing (i.e., logging and sampling) are discussed.		

Work Steps	**Process or Activity**	**Hazards**	**Hazard Control**
• Transportation of sediment/soil cores from the point of collection to the processing location		• Cores (especially water-logged sediment cores) may be very heavy	• When handling heavy cores, use proper lifting techniques, request help with heavy/bulky loads, and use mechanical assistance when available
• Cutting open of plastic core liners using blades or electric shears		• Use of blades	• Leather or kevlar gloves must be worn when using a blade to cut core liners • Retractible safety blades should be used. Open blades cannot be used • When using blades, pull them away from your body • Do not pull blades towards your body and keep body parts out of the "line of fire"
		• Electric shears	• Inspect electric shears before use • Only properly trained individuals can use the electric shears • Keep power cord neat and out of walkways (tripping hazard) • Keep power cord away from water (puddles) • Leather gloves must be worn when operating the electric shears
		• Exposure to contaminated sediment/soill	• A face shield and apron or Tyvek suit must be worn when cutting open plastic core liners
• Logging/sampling of cores		• Exposure to contaminated sediment/soil and volatile organic compound vapors	• Nitrile golves must be worn when handling sediment/soil (two layers of gloves is best) • Eating, drinking, and smoking will not be allowed in the core processing locations • Remove gloves and clean hands after processing cores • Cores should be processed in a well ventilated area - open doors/windows and/or use fans to create air flow if necessary • Perform air monitoring using a PID and dust monitor (see HASP for action levels)
		• Sharp edges on cut core liners and sharp objects in sediment/soil	• Gloves (leather or nitrile) must be worn when handling cut core liners • Kevlar gloves must be worn under nitrile gloves when handling core liners and soils • Keep hands away from cut liner edges • A wide enough strip of liner should be cut off each core to permit access to the sediment/soils without the need to place ones hand too close to the cut liner edges
•		•	•

Min. Personal Protective Equipment (PPE):	• Hardhat • Safety glasses • Gloves • Steel-toed/hard-toed boots • Hearing protection when working around loud noises • Traffic vest when working around vehicles or heavy equipment • Coast Guard-approved Personal Floatation Device (PFD) when working on or near water • Tyvek suits may be worn if desired to protect against getting contaminated water or sediment on clothing or skin

Individuals Must Sign the last page of this THA after review.

PRE-WORK THA

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
WALKING/WORKING SURFACES		
☒	☒ Uneven terrain ☒ Slippery surfaces	☒ Walkways are cleared of equipment, vegetation, excavated material, tools and debris ☒ Pits and floor openings are covered or otherwise guarded ☒ Work areas are illuminated adequately; field operations are not conducted before sunrise or after sunset unless adequate lighting is provided. ☒ Spills are cleaned up promptly ☒ Salt applied to icy areas, snow cleared from walkways
☐	LADDERS / STAIRS ☐ Extension Ladders ☐ Step Ladders ☐ Fixed Ladders ☐ Stairs	☐ Employees trained in safe ladder use at safety meeting ☐ Extension ladders are properly footed, secured at top, and setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity. **Ladders/Stairs Comments:** _____
☐	MANLIFT used to reach work ☐ Scissor Lift ☐ Extensible Boom ☐ Articulated Boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use. **Manlift Comments:** _____
WORKING ALONE		
☐	☐ Getting injured or incapacitated with no one else around to help ☐ Falling victim to crime	☐ Someone else knows your whereabouts, what you're doing and when you should be expected back to their office or project site location. This will be accomplished by communicating three (3) times at a minimum with the supervisor or the project manager 1 – Upon Arrival 2 – Midway through the day 3 – Upon Departure ☐ Ensure the area has wireless coverage; summon alternate communication method if wireless phones are not operable. ☐ Checked the weather forecast to avoid being caught up in bad weather conditions; ☐ Ensured that vehicle has sufficient fuel and is well maintained; ☐ Allowed self sufficient time for the trip so that you are not rushing; ☐ Drive with any bags, records and equipment hidden so that you are not seen hiding them as you park. **Working Alone Comments:** _____
EXCAVATIONS / TRENCHING/UNDERGROUND HAZARDS		
☐	☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. (specify below) ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard (specify below) ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Underground utilities have been identified and marked. ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ Hand digging within 3' of utility locations. ☐ Excavations are protected by perimeter fencing (not barricade tape): (☐ Rigid fence - chain link or wood, ☐ safety fence 6' from edge.) **Excavation Comments:** _____

PRE-WORK THA

CONFINED SPACES		
☐	☐ No Serious Hazards ☐ Toxic atmosphere ☐ Carbon monoxide ☐ Hydrogen sulfide ☐ _____ ☐ Flammable atmosphere ☐ Low oxygen ☐ Combustible dust ☐ Other Serious Hazard: _____	☐ Confined space is altered so that it is no longer a confined space. (describe below) ☐ Confined space is downgraded to a non-permit confined space. (identify which spaces below) ☐ Alternate Entry is used. (Identify which space qualify for confined space entry below) ☐ Full permit-required confined space entry is used due to presence of serious hazards. ☐ Rescue team has been notified (☐ Paid FD ☐ Volunteer FD ☐ Plant Rescue) Rescue team: _____ Phone number: _____ ☐ All entrants and attendants for Alternate Entry and Permit-Required Entry have confined space entry training. **Confined Space Comments:** _____
BOAT OPERATIONS/WORKING ON or NEAR WATER and ICE		
☐	☐ Drowning ☐ Hypothermia	☐ Only qualified employees are operating the boat ☐ Coast Guard-approved Personal Flotation Device (PFD), sized and adjusted to the wearer, is worn by all when involved in boat operations. ☐ A float plan is completed prior to leaving dock. ☐ Emergency equipment like ring buoy, flares and fire extinguishers are present **Boat, Water Operations Comments:** _____
DRILLING		
☐	☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills	☐ Contractor inspected the drill rig ☐ High visibility vests, hard hats are being worn near the equipment ☐ Operators and helpers will maintain a safe distance to moving parts. All those working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ IDW is being managed as per regulations ☐ Area is surveyed for overhead utilities ☐ Hearing protection is used when working near the rig ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill Kit Located: _____ **Drilling Operations Comments:** _____
HEAVY EQUIPMENT [other than cranes]		
☐	☐ Max. safe slope for each vehicle will be followed ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Bulldozer ☐ Excavator ☐ Front Loader ☐ Mini Skid Steer (Bobcat) ☐ Mini Excavator ☐ Dump Truck ☐ Drill/Boring Rig ☐ Lull / Material Handler ☐ Forklift ☐ Manlift - specify type(s) ☐ Land Clearing loader	☐ Qualified persons operate all heavy equipment. (certificate is required for forklift and lull operators) ☐ Equipment will be inspected upon mobilization ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators will be reminded of seatbelt use by: _____ ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope for each vehicle will be followed ☐ Counterweight swing radius will be barricaded. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. Crane hook attachments will be used (specify): _____ ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____

PRE-WORK THA

CRANES

☐	☐ Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Wire rope failure – condition, loading, safety lines ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ _____ ☐ _____ ☐ _____	☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan will be developed and approved prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist will be completed and signed. ☐ A Critical Lift Checklist will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a discrete channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to winds exceeding 35mph. Hoisting equipment will be re-inspected and confirmed to be in operable condition prior to re-use. ☐ Cranes will not travel with personnel on the platform. Note that [Contractor] personnel are prohibited from entering the immediate vicinity of the crane during operation, unless prior approval has been obtained from the Corporate EHS Dept. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Total weight of the load will not exceed 50% of the rated capacity for the crane radius and configuration. ☐ Crane hooks will be moused or provided with safety latches. ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope (<1%) will be followed ☐ Counterweight swing radius will be barricaded. ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____ **Crane Hazards Comments:** _____ [Consultant/Engineer] personnel are prohibited from suspended personnel lifting.

ENVIRONMENTAL HAZARDS (NON CHEMICAL)

☒	☒ Heat Stress ☒ Cold Stress ☒ Insects, spiders, ticks ☐ Wild animals ☐ Mold, fungi ☐ Poisonous plants ☐ Hazardous noise	☒ Heat/Cold stress are monitored in accordance with [Consultant/Engineer] procedures ☒ Fluids are provided to prevent worker dehydration ☒ Types and injury potential of snakes, insects, spiders are reviewed with workers ☒ Insect repellant is used, PPE is used to protect against sting/bite injuries. ☐ All potentially poisonous plants such as poison ivy, poison oak, poison sumac are identified, long sleeve shirt or Tyvek is worn or a barrier cream is used when near these plants ☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) **Environmental Hazards Comments:** _____

POWER TOOLS, HAND TOOLS, and EXTENSION CORDS

☒	Eye injury, hand/arm cuts, electrical shock, strains, foot injuries, dust ☐ Grinders ☐ Needle Gun ☐ Chop saw ☐ Chain saw ☐ Trimmer ☐ Concrete/asphalt saw	☒ All tools and electrical cords will be inspected upon mobilization by: _____ ☒ All tools and electrical cords in-use will be inspected daily by: _____ ☐ Grinder speeds will not exceed grinding wheel ratings. ☐ Water or wet cutting performed to control dust ☐ Respirators used to prevent exposure to dust (respirator type: _____) ☐ Thorough utility survey conducted prior to any concrete cutting, coring ☐ Face shield and safety glasses used (required for all grinders, jackhammers, chain saws, etc.) ☐ Kevlar chaps and jacket (required for all chainsaw work) ☐ Hearing protection required for which tools or areas: _____ ☒ All extension cords are in good condition with no cuts through outer insulation, ground plugs are present, and no "vinyl tape" repairs. **Tool & Cord Comments:** Electric shears must only be operated by properly trained individuals. Leather gloves should be worn when operating electric shears.

PRE-WORK THA

MANUAL MATERIAL HANDLING / MATERIAL STORAGE / HOUSEKEEPING

☒	Back or shoulder strain, struck by falling objects, trips and falls, incompatible materials (fire or explosion) ☒ Hvy manual lifting (>30 lbs) ☐ Chemical storage ☐ Compressed gas storage ☐ Tall storage greater than 2 pallets stacked. ☐ Material & equipment laydown areas ☐ Debris removal	☒ Mechanical lifting equipment used to reduce manual material handling: (☐ Forklift/Lull ☐ Heavy Equipment ☐ Chainfall ☒ Vehicles) ☒ Manual lifting more than 50 lbs by a single person will be avoided. ☒ Good manual lifting techniques will be reviewed prior to site work. ☐ Incompatible chemicals will be separated by 20' ☐ Secondary containment will be provided for the following chemicals: _____ ☐ Safety equipment will be located near chemical storage. ☐ Spill Kit ☐ Emergency Shower ☐ Eyewash ☐ Drench Hose ☐ Splash PPE ☐ Flammable gases and oxygen will be separated by 20'. ☐ All compressed gas cylinders will be transported vertically and secured upright. ☐ Equipment and materials will not be stored on site ☐ Debris will be moved daily and placed in designated areas. **Material Handling & Housekeeping Comments:** _____

TRAFFIC & SIDEWALK OBSTRUCTION

☐	☐ Vehicle accidents ☐ Pedestrians struck by vehicles or heavy equipment ☐ Pedestrians falls ☐ Pedestrian struck-by falling objects	☐ DOT signal devices will be used to re-route vehicles around excavations or busy site entrances/exits that affect road traffic. ☐ Flaggers will be used and have DOT Flagger Training ☐ Pedestrian traffic will be safely routed around or over excavations. ☐ Pedestrian traffic will be safely routed around or under overhead work. **Traffic & Sidewalk Comments:** _____

HAZARDOUS WASTE SITE WORK

☒	☒ Exposure to hazardous vapors or dust, contact with contaminated materials, fire, and explosion. Contaminants of Concern and hazardous chemicals include: ☒ Volatile organic compounds (describe: BTEX) ☒ Semivolatile organic cmpds (describe: Coal tar and coal tar products) ☒ Metal dusts (describe arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, and zinc) ☒ PCBs ☐ Caustic (NaOH) ☐ Acid (H_2SO_4, HCl) ☒ Other hazardous waste site hazards are covered elsewhere in the HASP)	☒ Site workers with a potential for contact with contaminated materials will have OSHA 40-hour training, current 8-hour refresher, and medical exam. ☐ No intrusive work activities or areas are anticipated with current scope of work. Intrusive work activities include: _____ The perimeter of intrusive work areas are identified by: _____ Decontamination of personnel or equipment is not anticipated with the current scope of work. ☐ Decontamination of personnel and small tools will be conducted as follows: _____ ☐ Decontamination of heavy equipment will be conducted as follows: _____ ☐ Heavy equipment leaving the site will be inspected by: _____ ☐ Work area monitoring is not anticipated with the current scope of work. ☒ Work Area Air Monitoring as follows for (dust, VOCs, etc.) **OR** see attached. _____ to _____ Level C: Tyvek, boot covers, nitrile gloves, half or full face respirator with _____ cartridges changed daily _____ to _____ Level B: Same as above except supplied air respirator _____ to _____ STOP work, contact EHS Department ☐ Community Air Monitoring is not anticipated with the current scope of work. ☐ Community Air Monitoring is required per the attached document. **Comments/Other:** _____

PRE-WORK THA

EMERGENCY RESPONSE (911 Service is Available ☒ Yes ☐ No)			
Emergency Medical Treatment - Hospital Name: Hospital Address:	Brooklyn Hospital Center 121 DeKalb Avenue Brooklyn, New York 11205	**Phone:**	718-250-8000
Non-Emergency Med. Treatment - Clinic Name: Occupational Clinic Address:	Interfaith Medical Center 1545 Atlantic Avenue Brooklyn, New York 11213	**Phone:**	718-613-4988
Fire Department Name	New York Fire Department	**Phone:**	911
Spill Response:	New York Fire Department	**Phone:**	911
Client Representative Name::		**Office:**	
		Cell:	
[Consultant/Engineer] Project Manager Name:		**Office:**	
		Cell:	
[Consultant/Engineer] Corporate H&S Name:		**Office:**	
		Cell:	
Emergency Response Comments:			

Date:	
Project Name:	**Gowanus Canal Superfund Site**
THA Title:	**Sediment & Soil Logging and Sampling Task Hazard Analysis**
Subcontractor Name:	
[Consultant/Engineer] Representative (reviewed by):	
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO [CONTRACTOR] PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

PRE-WORK THA

THA Title:	**Waste Characterization Sampling & Drum Handling Task Hazard Analysis**	**Date:**	**18 February 2014**
Project Name:	**Gowanus Canal Superfund Site**	**Client Name:**	**National Grid**
Project Number:		**Client Project Manager:**	
Project Location:	**Brooklyn, New York**	**[Consultant/Engineer] Project Manager:**	
Scope of Work Summary:	As part of the Pre-Design Work it is expected that waste sediment/soil and water will be generated, that these wastes will be containerized in 55-gallone open top steel drums, and that samples of these waste streams will need to be collected for waste characterization analyses.		

Work Steps	**Process or Activity**	**Hazards**	**Hazard Control**
• Working with drums		• Drum handling/heavy lifting	• Stage drums on flat hard surfaces (i.e., on concrete/asphalt or plywood/wood pallets, not on soft ground) in a secure but accessible location • Do not manhandle drums - use mechanical assistance (e.g., a vehicle with a lift gate) to move drums if necessary
		• Pinch points	• Do not place hands or limbs between drums during repositioning • Wear leather gloves when working with drums - especially when working with the compression ring around the top
• Collecting waste characterization samples		• Exposure to organic vapors	• After opening drums, allow to vent before collecting samples • Use a PID to monitor the breathing zone
		• Exposure to contaminated sediment/soil and water	• Wear gloves to prevent contact with contaminated sediment/soil and water • Wear a Tyvek suit to prevent contact with contaminated sediment/soil and water if necessary
•		•	•

Min. Personal Protective Equipment (PPE):	• Hardhat • Safety glasses • Gloves • Steel-toed/hard-toed boots • Hearing protection when working around loud noises • Traffic vest when working around vehicles or heavy equipment • Coast Guard-approved Personal Floatation Device (PFD) when working on or near water • Tyvek suits may be worn if desired to protect against getting contaminated water or sediment on clothing or skin

Individuals Must Sign the last page of this THA after review.

PRE-WORK THA

HAZARD		HAZARD CONTROLS (check all that apply and comment as required)
WALKING/WORKING SURFACES		
☒	☒ Uneven terrain ☒ Slippery surfaces	☒ Walkways are cleared of equipment, vegetation, excavated material, tools and debris ☐ Pits and floor openings are covered or otherwise guarded ☒ Work areas are illuminated adequately; field operations are not conducted before sunrise or after sunset unless adequate lighting is provided. ☒ Spills are cleaned up promptly ☐ Salt applied to icy areas, snow cleared from walkways
☐	LADDERS / STAIRS ☐ Extension Ladders ☐ Step Ladders ☐ Fixed Ladders ☐ Stairs	☐ Employees trained in safe ladder use at safety meeting ☐ Extension ladders are properly footed, secured at top, and setup at proper angle ☐ Stepladders are set on level ground or properly shimmed with spreaders locked. ☐ Stairs have proper rise over run and stairs >4 steps or 4' have guardrails. ☐ Never use a step ladder as a straight ladder. All straight ladders shall be extended three rungs past leading edge. Never use metal ladders while working with electricity. **Ladders/Stairs Comments:** _____
☐	MANLIFT used to reach work ☐ Scissor Lift ☐ Extensible Boom ☐ Articulated Boom ☐ Vertical Lift ("Genie")	☐ Operators are sufficiently trained, experienced and qualified. ☐ Equipment is inspected after mobilization and is in good condition. ☐ Harness & Lanyard worn whenever operating the lift (scissor lifts may be excepted) ☐ Overhead and surface obstructions are reviewed with operators prior to use. **Manlift Comments:** _____
WORKING ALONE		
☐	☐ Getting injured or incapacitated with no one else around to help ☐ Falling victim to crime	☐ Someone else knows your whereabouts, what you're doing and when you should be expected back to their office or project site location. This will be accomplished by communicating three (3) times at a minimum with the supervisor or the project manager 1 – Upon Arrival 2 – Midway through the day 3 – Upon Departure ☐ Ensure the area has wireless coverage; summon alternate communication method if wireless phones are not operable. ☐ Checked the weather forecast to avoid being caught up in bad weather conditions; ☐ Ensured that vehicle has sufficient fuel and is well maintained; ☐ Allowed self sufficient time for the trip so that you are not rushing; ☐ Drive with any bags, records and equipment hidden so that you are not seen hiding them as you park. **Working Alone Comments:** _____
EXCAVATIONS / TRENCHING/UNDERGROUND HAZARDS		
☐	☐ Max Depth ≥ 20' ☐ Max Depth ≥ 5' ☐ Max Depth <5' with potential cave-in hazard ☐ Potential permit-required confined space at depth ≥ 4' ☐ Underground utilities ☐ Structures/foundations ☐ Falls into excavations	☐ Sloping & shoring for excavations ≥20' are approved by a professional engineer ☐ Sloping & shoring for excavations ≥5' when persons are exposed to cave-in. (specify below) ☐ Sloping & shoring for shallow (<5') excavations with cave-in hazard (specify below) ☐ Excavations ≥ 4' are classified as a non-permit confined space ☐ Excavations ≥ 4' are classified as Alternate Entry or Permit-Required (see confined space) ☐ Underground utilities have been identified and marked. ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ Hand digging within 3' of utility locations. ☐ Excavations are protected by perimeter fencing (not barricade tape): (☐ Rigid fence - chain link or wood, ☐ safety fence 6' from edge.) **Excavation Comments:** _____

PRE-WORK THA

CONFINED SPACES		
☐	☐ No Serious Hazards ☐ Toxic atmosphere ☐ Carbon monoxide ☐ Hydrogen sulfide ☐ _____ ☐ Flammable atmosphere ☐ Low oxygen ☐ Combustible dust ☐ Other Serious Hazard: _____	☐ Confined space is altered so that it is no longer a confined space. (describe below) ☐ Confined space is downgraded to a non-permit confined space. (identify which spaces below) ☐ Alternate Entry is used. (Identify which space qualify for confined space entry below) ☐ Full permit-required confined space entry is used due to presence of serious hazards. ☐ Rescue team has been notified (☐ Paid FD ☐ Volunteer FD ☐ Plant Rescue) Rescue team: _____ Phone number: _____ ☐ All entrants and attendants for Alternate Entry and Permit-Required Entry have confined space entry training. **Confined Space Comments:** _____
BOAT OPERATIONS/WORKING ON or NEAR WATER and ICE		
☐	☐ Drowning ☐ Hypothermia	☐ Only qualified employees are operating the boat ☐ Coast Guard-approved Personal Flotation Device (PFD), sized and adjusted to the wearer, is worn by all when involved in boat operations. ☐ A float plan is completed prior to leaving dock. ☐ Emergency equipment like ring buoy, flares and fire extinguishers are present **Boat, Water Operations Comments:** _____
DRILLING		
☐	☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Underground utilities, aboveground ☐ Spills	☐ Contractor inspected the drill rig ☐ High visibility vests, hard hats are being worn near the equipment ☐ Operators and helpers will maintain a safe distance to moving parts. All those working near moving or rotating parts will secure loose hair, clothing, and equipment. ☐ Drill rigs will only be moved with masts lowered. Masts will be erected with outriggers fully extended when equipped with outriggers. ☐ Max. safe slope for rig will be followed ☐ Spinning parts of the rig are guarded when possible, no loose clothing being worn near the rig ☐ Local "dig safe" organization has been notified for utility locations in public areas or rights of way. Phone number: _____ Date: _____ ☐ IDW is being managed as per regulations ☐ Area is surveyed for overhead utilities ☐ Hearing protection is used when working near the rig ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill Kit Located: _____ **Drilling Operations Comments:** _____
HEAVY EQUIPMENT [other than cranes]		
☐	☐ Max. safe slope for each vehicle will be followed ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ Bulldozer ☐ Excavator ☐ Front Loader ☐ Mini Skid Steer (Bobcat) ☐ Mini Excavator ☐ Dump Truck ☐ Drill/Boring Rig ☐ Lull / Material Handler ☐ Forklift ☐ Manlift - specify type(s) ☐ Land Clearing loader	☐ Qualified persons operate all heavy equipment. (certificate is required for forklift and lull operators) ☐ Equipment will be inspected upon mobilization ☐ All leaks or defective safety equipment will be repaired before use. ☐ Operators will be reminded of seatbelt use by: _____ ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope for each vehicle will be followed ☐ Counterweight swing radius will be barricaded. ☐ Rigging directly to the forks of a lull, forklift, or front loader equipped forks is prohibited. Crane hook attachments will be used (specify): _____ ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____

PRE-WORK THA

CRANES

☐	☐ Overhead hazards – utility lines, swing radius, falling objects, wire ropes and hoisting equipment ☐ Overbalancing – high winds, outrigger placement, overloading, safe slope ☐ Wire rope failure – condition, loading, safety lines ☐ Struck By, Run-Over, Caught In Between (pinch points), Roll Over, Fluid Leaks ☐ _____ ☐ _____ ☐ _____	☐ Only qualified persons operate cranes (certificate required). ☐ A Critical Lift Plan will be developed and approved prior to mobilization. ☐ Equipment will be inspected prior to mobilization and a Crane Pre-Operational Safety Checklist will be completed and signed. ☐ A Critical Lift Checklist will be completed and signed prior to crane mobilization. ☐ Rigging, wire rope and hoisting equipment will be inspected and maintained on a weekly basis. ☐ Crane operator will remain at the controls at all times during operation. ☐ Crane operation must be performed under the direction of an appointed signal person at all times. ☐ Communication between crane operator and signal person will be maintained through standard hand signals or voice communication equipment. Radio equipment, if used, will be equipped with a discrete channel. ☐ Lifting or lowering will not exceed 100ft/minute. Lowering must be controlled i.e. no free fall. ☐ Stop work will be issued whenever hoisting equipment is exposed to winds exceeding 35mph. Hoisting equipment will be re-inspected and confirmed to be in operable condition prior to re-use. ☐ Cranes will not travel with personnel on the platform. Note that [Contractor] personnel are prohibited from entering the immediate vicinity of the crane during operation, unless prior approval has been obtained from the Corporate EHS Dept. ☐ Outriggers will be fully extended/locked with a firm footing within the maximum safe slope (<1%). ☐ Total weight of the load will not exceed 50% of the rated capacity for the crane radius and configuration. ☐ Crane hooks will be moused or provided with safety latches. ☐ Eye contact with the operator is made prior to approaching near equipment or swing radius ☐ High visibility vests are required ☐ Max. safe slope (<1%) will be followed ☐ Counterweight swing radius will be barricaded. ☐ Spill equipment is available for fuel and hydraulic fluid leaks. Spill kit located: _____ **Crane Hazards Comments:** _____ [Consultant/Engineer] personnel are prohibited from suspended personnel lifting.

ENVIRONMENTAL HAZARDS (NON CHEMICAL)

☐	☐ Heat Stress ☐ Cold Stress ☐ Insects, spiders, ticks ☐ Wild animals ☐ Mold, fungi ☐ Poisonous plants ☐ Hazardous noise	☐ Heat/Cold stress are monitored in accordance with [Consultant/Engineer] procedures ☐ Fluids are provided to prevent worker dehydration ☐ Types and injury potential of snakes, insects, spiders are reviewed with workers ☐ Insect repellant is used, PPE is used to protect against sting/bite injuries. ☐ All potentially poisonous plants such as poison ivy, poison oak, poison sumac are identified, long sleeve shirt or Tyvek is worn or a barrier cream is used when near these plants ☐ Hearing protection is used when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) **Environmental Hazards Comments:** _____

POWER TOOLS, HAND TOOLS, and EXTENSION CORDS

☐	Eye injury, hand/arm cuts, electrical shock, strains, foot injuries, dust ☐ Grinders ☐ Needle Gun ☐ Chop saw ☐ Chain saw ☐ Trimmer ☐ Concrete/asphalt saw	☐ All tools and electrical cords will be inspected upon mobilization by: _____ ☐ All tools and electrical cords in-use will be inspected daily by: _____ ☐ Grinder speeds will not exceed grinding wheel ratings. ☐ Water or wet cutting performed to control dust ☐ Respirators used to prevent exposure to dust (respirator type: _____) ☐ Thorough utility survey conducted prior to any concrete cutting, coring ☐ Face shield and safety glasses used (required for all grinders, jackhammers, chain saws, etc.) ☐ Kevlar chaps and jacket (required for all chainsaw work) ☐ Hearing protection required for which tools or areas: _____ ☐ All extension cords are in good condition with no cuts through outer insulation, ground plugs are present, and no "vinyl tape" repairs. **Tool & Cord Comments:** _____

PRE-WORK THA

MANUAL MATERIAL HANDLING / MATERIAL STORAGE / HOUSEKEEPING

☒	Back or shoulder strain, struck by falling objects, trips and falls, incompatible materials (fire or explosion) ☒ Hvy manual lifting (>30 lbs) ☐ Chemical storage ☐ Compressed gas storage ☐ Tall storage greater than 2 pallets stacked. ☐ Material & equipment laydown areas ☒ Debris removal	☒ Mechanical lifting equipment used to reduce manual material handling: (☐ Forklift/Lull ☐ Heavy Equipment ☐ Chainfall ☒ Vehicle with lift gate) ☒ Manual lifting more than 50 lbs by a single person will be avoided. ☒ Good manual lifting techniques will be reviewed prior to site work. ☐ Incompatible chemicals will be separated by 20' ☐ Secondary containment will be provided for the following chemicals: _____ ☐ Safety equipment will be located near chemical storage. ☐ Spill Kit ☐ Emergency Shower ☐ Eyewash ☐ Drench Hose ☐ Splash PPE ☐ Flammable gases and oxygen will be separated by 20'. ☐ All compressed gas cylinders will be transported vertically and secured upright. ☐ Equipment and materials will not be stored on site ☒ Debris will be moved daily and placed in designated areas. **Material Handling & Housekeeping Comments:** _____

TRAFFIC & SIDEWALK OBSTRUCTION

☐	☐ Vehicle accidents ☐ Pedestrians struck by vehicles or heavy equipment ☐ Pedestrians falls ☐ Pedestrian struck-by falling objects	☐ DOT signal devices will be used to re-route vehicles around excavations or busy site entrances/exits that affect road traffic. ☐ Flaggers will be used and have DOT Flagger Training ☐ Pedestrian traffic will be safely routed around or over excavations. ☐ Pedestrian traffic will be safely routed around or under overhead work. **Traffic & Sidewalk Comments:** _____

HAZARDOUS WASTE SITE WORK

☒	☒ Exposure to hazardous vapors or dust, contact with contaminated materials, fire, and explosion. Contaminants of Concern and hazardous chemicals include: ☒ Volatile organic compounds (describe: BTEX) ☒ Semivolatile organic cmpds (describe: Coal tar and coal tar products) ☒ Metal dusts (describe arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, thallium, and zinc) ☒ PCBs ☐ Caustic (NaOH) ☐ Acid (H_2SO_4, HCl) ☒ Other hazardous waste site hazards are covered elsewhere in the HASP)	☒ Site workers with a potential for contact with contaminated materials will have OSHA 40-hour training, current 8-hour refresher, and medical exam. ☐ No intrusive work activities or areas are anticipated with current scope of work. Intrusive work activities include: _____ The perimeter of intrusive work areas are identified by: _____ Decontamination of personnel or equipment is not anticipated with the current scope of work. ☐ Decontamination of personnel and small tools will be conducted as follows: _____ ☐ Decontamination of heavy equipment will be conducted as follows: _____ ☐ Heavy equipment leaving the site will be inspected by: _____ ☐ Work area monitoring is not anticipated with the current scope of work. ☒ Work Area Air Monitoring as follows for (dust, VOCs, etc.) **OR** see attached. _____ to _____ Level C: Tyvek, boot covers, nitrile gloves, half or full face respirator with _____ cartridges changed daily _____ to _____ Level B: Same as above except supplied air respirator _____ to _____ STOP work, contact EHS Department ☐ Community Air Monitoring is not anticipated with the current scope of work. ☐ Community Air Monitoring is required per the attached document. **Comments/Other:** _____

PRE-WORK THA

EMERGENCY RESPONSE **(911 Service is Available ☒ Yes ☐ No)**			
Emergency Medical Treatment - Hospital Name: Hospital Address:	Brooklyn Hospital Center 121 DeKalb Avenue Brooklyn, New York 11205	**Phone:**	718-250-8000
Non-Emergency Med. Treatment - Clinic Name: Occupational Clinic Address:	Interfaith Medical Center 1545 Atlantic Avenue Brooklyn, New York 11213	**Phone:**	718-613-4988
Fire Department Name	New York Fire Department	**Phone:**	911
Spill Response:	New York Fire Department	**Phone:**	911
Client Representative Name::		**Office:**	
		Cell:	
[Consultant/Engineer] Project Manager Name:		**Office:**	
		Cell:	
[Consultant/Engineer] Corporate H&S Name:		**Office:**	
		Cell:	
Emergency Response Comments:			

Date:	
Project Name:	**Gowanus Canal Superfund Site**
THA Title:	**Waste Characterization Sampling & Drum Handling Task Hazard Analysis**
Subcontractor Name:	
[Consultant/Engineer] Representative (reviewed by):	
Subcontractor Foreman/Supervisor Signature (authorize):	
Crew Signatures (acknowledge):	
Print Name	**Signature**

PLEASE RETURN A COPY OF THIS SIGNED PAGE TO [CONTRACTOR] PROJECT MGR., SUPERINTENDENT UPON REVIEW AND ACKOWLEDGMENT BY THE CREW MEMBERS. ALL NEW CREW MEMBERS SHALL BE ORIENTATED THE SAME AND A SUBMITTAL OF A NEW SIGN IN SHEET SHALL BE COMPLETED.

Appendix C: Summary of Chemical Hazards

Petroleum Hydrocarbons

Petroleum hydrocarbons likely at the Site include tar and/or fuel-related materials in soils and sediments. Gasoline, diesel, oil, and heavier hydrocarbons, such as grease, may be present. Volatile components of gasoline include benzene, toluene, ethylbenzene, and xylenes (BTEX).

The primary exposure routes for petroleum hydrocarbons during Site activities are inhalation, dermal contact, and ingestion of contaminated soil, sediment, dust, or water. Lighter petroleum hydrocarbons such as gasoline and benzene readily volatilize and are primarily an inhalation concern, whereas the primary route of exposure to heavier petroleum hydrocarbons such as aromatic hydrocarbons, oil, and grease is dermal contact. The target organs primarily affected by prolonged exposure to petroleum hydrocarbons are the respiratory system, central nervous system, kidneys, liver, and skin. Prolonged dermal contact with petroleum hydrocarbons can cause irritation or dermatitis. The BTEX compounds are known or suspected human carcinogens.

Petroleum hydrocarbons such as gasoline are also flammable and can be a physical hazard when present in high concentrations. Combustion of petroleum hydrocarbons can produce carbon dioxide, carbon monoxide, aldehydes, fumes, smoke (particulate matter) and other products of incomplete combustion. Neither intentional nor inadvertent combustion of petroleum hydrocarbons is expected during sampling activities; personnel will evacuate the area should a fire occur. The table below summarizes BTEX exposure limits.

Chemical Name	PEL[1]	TLV[2]
Benzene	1	0.5
Toluene	200	50
Ethylbenzene	100	100
Xylene	100	100

[1] OSHA Permissible Exposure Limit (in parts per million)

[2] ACGIH Threshold Limit Value (in parts per million)

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are produced during combustion events due to inadequate oxidation of fuel. PAHs in the pure state are yellowish crystalline solids. They are found in coal tar and in products of incomplete combustion. These chemicals have varying degrees of potency for causing cancer, with benzo(a)pyrene being among the most potent. The PAHs are evaluated collectively as coal tar pitch volatiles. Coal tar pitch volatiles may cause photo-sensitization and a rash where sunlight strikes the skin. Exposure may also cause cancer of lungs, skin, bladder or kidneys. Benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, and indeno(1,2,3,c,d)pyrene have been identified as carcinogenic.

While the potential for Site personnel sustaining significant inhalation exposures to volatilized PAH compounds during the Site activities of this project is minimal, there is the potential for inhalation of PAH-contaminated dust, and handling of contaminated soils presents skin exposure hazards. Use of dust suppression techniques (as appropriate) and the proper use of the PPE will adequately protect personnel. Some significant PAH compounds include:

- Anthracene
- Benzo(a)pyrene
- Benzo(a)anthracene
- Chrysene
- Benzo(b)fluoranthene
- Fluoranthene
- Benzo(k)fluoranthene
- Fluorene
- Benzo(g,h,i)perylene
- Indeno(1,2,3,c,d)pyrene
- Benzo(d,e,f)phenanthrene
- Phenanthrene
- Acenaphthene
- Acenaphthylene
- Naphthalene

OSHA PEL for coal tar pitch volatiles is 0.2 mg/m3 and NIOSH REL is 0.1 mg/m^3 , TLV 0.2 mg/m3 is for 8 hour time weighted average (TWA).

PCBs

PCBs are carcinogenic chlorinated hydrocarbons. Potential exposure routes are through inhalation, skin absorption, ingestion and skin or eye contact and may irritate eyes, cause acne, cause liver damage or have reproductive effects. Carcinogenic effects such as tumors and leukemia have been observed in animals. The OSHA permissible exposure limit (PEL) for 8-hour time-weighted average (TWA) is 1 mg/m^3 (skin). The NIOSH PEL is 0.001 mg/m^3.

Hydrogen Sulfide

Hydrogen sulfide is a naturally occurring gas often associated with organic clay and peat. Hydrogen sulfide gas is potentially toxic through inhalation, ingestion, and contact with the skin and eyes. Inhalation can result in respiratory irritation, rhinitis, and edema of the lungs. Inhalation of hydrogen sulfide gas can result in headache, dizziness, and agitation. Acute exposure at high concentrations may result in coma and death as a result of respiratory failure. Hydrogen sulfide gas has a distinct rotten egg odor, and will be noted if encountered in the field. The OSHA permissible exposure limit (PEL) for 8 hr. TWA is 20 ppm, the NIOSH REL is 10 ppm, and the ACGIH TLV is 1ppm.

RCRA Metals

These metals include arsenic, barium, cadmium, chrome, mercury, selenium, and silver. Heavy metals are known to cause neurologic effects (lead, mercury), kidney damage (cadmium), and respiratory damage (arsenic, cadmium). Oral and respiratory exposures should be minimized. The table below summarizes exposure limits for selected metals.

Chemical Name	PEL[1]	TLV[2]
Arsenic	0.01	0.01
Lead	0.05	0.05
Mercury	0.01	0.25

[1] OSHA Permissible Exposure Limit (PEL) in parts per million

[2] ACGIH Threshold Limit Value (TLV) in parts per million

Appendix D: Air Monitoring

Applies to Task:

☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☒ 6 ☒ 7 ☐ 8 ☐ 9 ☐ 10

☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☒ 16 ☐ 17 ☐ 18 ☐ 19 ☐ 20

☐ 21 ☐ 22 ☐ 23 ☐ 24 ☐ 25 ☐ 26 ☐ Not Applicable

☒ *Photoionization Detector (PID)*

Brand/Model No.: TBD **eV:**

Monitoring Frequency: TBD

Breathing Zone Reading (ppm)	Action
TBD to TBD	Level D PPE
TBD to TBD	Level C PPE
Greater than TBD	Stop work. Evacuate the area. If upon return, levels still exceed the action level, stop work and implement engineering controls.

Note: _____

☐ *Oxygen (O_2) Meter*

Brand/Model No.: _____

Monitoring Frequency: _____

Reading (%)	Action
Less than 19.5	Stop work. Evacuate the area.
19.5 to 23.5	Continue to work with caution.
Greater than 23.5	Stop work. Evacuate the area.

Note: _____

☐ *Explosimeter*

Brand/Model No.: _____

Monitoring Frequency: _____

Source (% LEL)

Reading	Action
1 to 10	Continue with caution.
Greater than 10	Stop work. Evacuate the area. If upon return, if concentration still exceeds 10% LEL, ventilate until concentration is back to <10% LEL.

Note: _____

☐ *Flame Ionization Detector (FID)*

Brand/Model No.: _____

Monitoring Frequency: _____

Breathing Zone Reading (ppm)	Action
_____ to _____	Level D PPE
_____ to _____	Level C PPE
Greater than _____	Stop work. Evacuate the area. If upon return, levels still exceed ___, stop work and implement engineering controls.

Note: _____

☐ *Chemical Detector Tube*

Brand/Model No.: _____

Monitoring Frequency: _____

Breathing Zone Reading (ppm)	Action
_____ to _____	Level D PPE
_____ to _____	Level C PPE
Greater than _____	Stop work. Evacuate the area. If upon return, levels still exceed ___, stop work and implement engineering controls.

Note: _____

☐ *Other*

Brand/Model No.: _____

Monitoring Frequency: _____

Breathing Zone Reading	Action
_____ to _____	Level D PPE
_____ to _____	Level C PPE
Greater than _____	Stop work. Evacuate the area. If upon return, levels still exceed ___, stop work and implement engineering controls.

Note: _____

Appendix E: Personal Protective Equipment

Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8	Task 9	Task 10
☒ D ☐ C	☐ D ☐ C	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☒ D ☐ C	☐ D ☐ C	☒ D ☐ C	☐ D ☐ C
Task 11	Task 12	Task 13	Task 14	Task 15	Task 16	Task 17	Task 18	Task 19	Task 20
☒ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C	☒ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C	☒ D ☐ C
Task 21	Task 22	Task 23	Task 24	Task 25	Task 26				
☒ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C	☐ D ☐ C				

Modified Level D		***Level C***	
Equipment	***Material/Type***	***Equipment***	***Material/Type***
☒ Safety glasses		☐ Full-face air-purifying respirator	Cartridge Type:
☒ Hard-toed boots		☐ Half-mask air-purifying respirator	Cartridge Type:
☒ Protective clothing		☐ Safety glasses	
☒ Hard hat*		☐ Hard-toed boots	
☒ Hearing protection*		☐ Protective clothing	
☒ High-visibility vest*		☐ Hard hat	
☒ Outer boots*		☐ Hearing protection*	
☒ Outer gloves*		☐ High-visibility vest*	
☐ Other:		☐ Outer boots*	
		☐ Outer gloves*	
		☐ Inner gloves*	

* PPE items may be downgraded (only with concurrence of SHSO and PM)

Appendix F: Safety Data Sheets

Included in this HASP	Chemical
☐	Acetone
☒	Alconox
☐	Ammonia
☒	Bentonite
☐	Diesel Fuel Oil No. 2-D
☒	Gasoline
☐	Helium
☐	Hexane
☒	Hydrochloric Acid
☐	Hydrogen
☒	Isobutylene Calibration Gas
☐	Isopropyl Alcohol
☐	Methane Calibration Gas
☒	Nitric Acid
☐	Permanganate
☐	Portland Cement
☒	Sulfuric Acid
☐	Other:
☐	Other:
☐	Other:
☐	Other:

Note: SDSs are for chemicals that used to perform project work, not Site contaminants.

ALCONOX MSDS

Section 1 : MANUFACTURER INFORMATION

Product name: Alconox

Supplier: Same as manufacturer.

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Manufacturer emergency phone number: 800-255-3924.
813-248-0585 (outside of the United States).

Manufacturer: Alconox, Inc.
30 Glenn St.
Suite 309
White Plains, NY 10603.

Supplier MSDS date: 2009/04/20

D.O.T. Classification: Not regulated.

Section 2 : HAZARDOUS INGREDIENTS

C.A.S.	CONCENTRATION %	Ingredient Name	T.L.V.	LD/50	LC/50
25155-30-0	10-30	SODIUM DODECYLBENZENESULFONATE	NOT AVAILABLE	438 MG/KG RAT ORAL 1330 MG/KG MOUSE ORAL	NOT AVAILABLE
497-19-8	7-13	SODIUM CARBONATE	NOT AVAILABLE	4090 MG/KG RAT ORAL 6600 MG/KG MOUSE ORAL	2300 MG/M3/2H RAT INHALATION 1200 MG/M3/2H MOUSE INHALATION
7722-88-5	10-30	TETRASODIUM PYROPHOSPHATE	5 MG/M3	4000 MG/KG RAT ORAL 2980 MG/KG MOUSE ORAL	NOT AVAILABLE
7758-29-4	10-30	SODIUM PHOSPHATE	NOT AVAILABLE	3120 MG/KG RAT ORAL 3100 MG/KG MOUSE ORAL >4640 MG/KG RABBIT DERMAL	NOT AVAILABLE

Section 2A : ADDITIONAL INGREDIENT INFORMATION

Note: (supplier).
CAS# 497-19-8: LD50 4020 mg/kg - rat oral.
CAS# 7758-29-4: LD50 3100 mg/kg - rat oral.

Section 3 : PHYSICAL / CHEMICAL CHARACTERISTICS

Physical state: Solid

Appearance & odor: Almost odourless.
White granular powder.

Odor threshold (ppm): Not available.

Vapour pressure (mmHg): Not applicable.

Vapour density (air=1): Not applicable.

By weight: Not available.

Evaporation rate (butyl acetate = 1): Not applicable.

Boiling point (°C): Not applicable.

Freezing point (°C): Not applicable.

pH: (1% aqueous solution).
9.5

Specific gravity @ 20 °C: (water = 1).
0.85 - 1.10

Solubility in water (%): 100 - > 10% w/w

Coefficient of water\oil dist.: Not available.

VOC: None

Section 4 : FIRE AND EXPLOSION HAZARD DATA

Flammability: Not flammable.

Conditions of flammability: Surrounding fire.

Extinguishing media: Carbon dioxide, dry chemical, foam.
Water
Water fog.

Special procedures: Self-contained breathing apparatus required.
Firefighters should wear the usual protective gear.

Auto-ignition temperature: Not available.

Flash point (°C), method: None

Lower flammability limit (% vol): Not applicable.

Upper flammability limit (% vol): Not applicable.

Not available.

Sensitivity to mechanical impact: Not applicable.

Hazardous combustion products: Oxides of carbon (COx).
Hydrocarbons.

Rate of burning: Not available.

Explosive power: None

Section 5 : REACTIVITY DATA

Chemical stability:	Stable under normal conditions.
Conditions of instability:	None known.
Hazardous polymerization:	Will not occur.
Incompatible substances:	Strong acids. Strong oxidizers.
Hazardous decomposition products:	See hazardous combustion products.

Section 6 : HEALTH HAZARD DATA

Route of entry:	Skin contact, eye contact, inhalation and ingestion.
Effects of Acute Exposure	
Eye contact:	May cause irritation.
Skin contact:	Prolonged contact may cause irritation.
Inhalation:	Airborne particles may cause irritation.
Ingestion:	May cause vomiting and diarrhea. May cause abdominal pain. May cause gastric distress.
Effects of chronic exposure:	Contains an ingredient which may be corrosive.
LD50 of product, species & route:	> 5000 mg/kg rat oral.
LC50 of product, species & route:	Not available for mixture, see the ingredients section.
Exposure limit of material:	Not available for mixture, see the ingredients section.
Sensitization to product:	Not available.
Carcinogenic effects:	Not listed as a carcinogen.
Reproductive effects:	Not available.
Teratogenicity:	Not available.
Mutagenicity:	Not available.
Synergistic materials:	Not available.
Medical conditions aggravated by exposure:	Not available.
First Aid	
Skin contact:	Remove contaminated clothing. Wash thoroughly with soap and water. Seek medical attention if irritation persists.
Eye contact:	Check for and remove contact lenses. Flush eyes with clear, running water for 15 minutes while holding eyelids open: if irritation persists, consult a physician.
Inhalation:	Remove victim to fresh air. Seek medical attention if symptoms persist.
Ingestion:	Dilute with two glasses of water. Never give anything by mouth to an unconscious person. Do not induce vomiting, seek immediate medical attention.

Section 7 : PRECAUTIONS FOR SAFE HANDLING AND USE

Leak / Spill: Contain the spill.
Recover uncontaminated material for re-use.
Wear appropriate protective equipment.
Contaminated material should be swept or shoveled into appropriate waste container for disposal.

Waste disposal: In accordance with municipal, provincial and federal regulations.

Handling procedures and equipment: Protect against physical damage.
Avoid breathing dust.
Wash thoroughly after handling.
Keep out of reach of children.
Avoid contact with skin, eyes and clothing.
Launder contaminated clothing prior to reuse.

Storage requirements: Keep containers closed when not in use.
Store away from strong acids or oxidizers.
Store in a cool, dry and well ventilated area.

Section 8 : CONTROL MEASURES

Precautionary Measures

Gloves / Type:

Neoprene or rubber gloves.

Respiratory / Type:

If exposure limit is exceeded, wear a NIOSH approved respirator.

Eye / Type:

Safety glasses with side-shields.

Footwear / Type: Safety shoes per local regulations.

Clothing / Type: As required to prevent skin contact.

Other / Type: Eye wash capability should be in close proximity.

Ventilation requirements: Local exhaust at points of emission.

Material Safety Data Sheet

Version 3.0
Revision Date 12/29/2008
Print Date 06/16/2009

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Bentonite

Product Number : 285234
Brand : Sigma-Aldrich

Company : Sigma-Aldrich Canada, Ltd
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA
Telephone : +1 9058299500
Fax : +1 9058299292
Emergency Phone # : 800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Montmorillonite

Formula : H2Al2O6Si
Molecular Weight : 180.1 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Bentonite a colloidal clay. consist primarily of montmorillonite			
1302-78-9	215-108-5	-	-

3. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs

Lungs

WHMIS Classification

Not WHMIS controlled. Not WHMIS controlled.

HMIS Classification

Health Hazard: 0
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

4. FIRST AID MEASURES

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	not applicable
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation.

Environmental precautions
Do not let product enter drains.

Methods for cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
For prolonged or repeated contact use protective gloves.

Eye protection
Safety glasses

Hygiene measures
General industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	granules
Colour	grey, beige

Safety data

pH	6.0 - 9.0
Melting point	no data available
Boiling point	no data available
Flash point	not applicable
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	2.400 g/cm3
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Materials to avoid
Strong acids

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Aluminum oxide, silicon oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Intravenous - rat - 35 mg/kg
Remarks: Lungs, Thorax, or Respiration:Acute pulmonary edema.

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

Carcinogenicity - mouse - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Liver:Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Signs and Symptoms of Exposure

Lung irritation, Asthma

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.
Target Organs	Lungs,

Additional Information
RTECS: CT9450000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 19,000 mg/l - 96 h

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

DSL Status
All components of this product are on the Canadian DSL list.

WHMIS Classification

Not WHMIS controlled.	Not WHMIS controlled.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: GASOLINE, UNLEADED AUTOMOTIVE
Product Description: Hydrocarbons and Additives
Product Code: 123455-20, 9700, 977032, 977217, 977306, 977360, 977371, 977381, 977445, 977562, 977767, 977920, 979533, 97A039, 97A065, 97A078, 97A087, 97A102, 97A108, 97A146, 97A147, 97A152, 97A193, 97A200, 97A240, 97A266, 97A273, 97A290, 97A305, 97A316, 97A317, 97A328, 97A347, 97A380, 97A404, 97A424, 97A431, 97A441, 97A514, 97A556, 97A557, 97A613, 97A634, 97A653, 97A655, 97A659, 97A686, 97A696, 97A703, 97A712, 97A726, 97A736, 97A746, 97A767, 97A794, 97A798, 97A827, 97A848, 97A851, 97A876, 97A883, 97A907, 97A934, 97A948, 97A949, 97A960, 97A983, 97A989, 97AV99, 97AW00, 97AW01, 97AW38, 97AZ87, 97AZ88, 97AZ89, 97AZ90, 97AZ91, 97AZ92, 97AZ93, 97AZ94, 97AZ95, 97AZ96, 97AZ97, 97AZ98, 97AZ99, 97BA11, 97BA12, 97BA13, 97BA14, 97BA15, 97BA16, 97BA67, 97BA68, 97BA69, 97BA70, 97BE24, 97BE25, 97BE26, 97BE27, 97BE28, 97BE29, 97BE30, 97BE31, 97BE32, 97BE33, 97BE34, 97BE35, 97BE36, 97BE37, 97BE38, 97BE39, 97BN13, 97BN50, 97C070, 97C072, 97C075, 97C110, 97C112, 97C113, 97C118, 97C127, 97C140, 97C148, 97C166, 97C417, 97C558, 97C576, 97C632, 97C702, 97C731, 97C759, 97C770, 97C782, 97C794, 97C870, 97C917, 97D130, 97D228, 97E002, 97E010, 97E041, 97E065, 97E087, 97E103, 97E104, 97E11, 97E112, 97E113, 97E170, 97E171, 97E196, 97E197, 97E259, 97E260, 97E304, 97E305, 97E347, 97E42, 97E532, 97E564, 97E581, 97E595, 97E606, 97E611, 97E619, 97E649, 97E655, 97E66, 97E682, 97E749, 97E860, 97E88, 97E999, 97F005, 97F020, 97F030, 97F054, 97F312, 97F344, 97F952, 97M190, 97M191, 97M192, 97M193, 97M194, 97M195, 97M229, 97M230, 97M232, 97N832, 97N844, 97N848, 97N861, 97N873, 97N877, 97N879, 97N891, 97N895, 97N913, 97N917, 97N921, 97N941, 97N942, 97N954, 97Q303, 97Q763, 97Q781, 97Q782, 97R368, 97S760, 97U927, 97V321, 97V323, 97V325, 97V326, 97X861, EMGF20
Intended Use: Fuel, Gasoline

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
ETHYL ALCOHOL	64-17-5	< 11%
Gasoline	86290-81-5	89 - 100%

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*
BENZENE	71-43-2	0.1 - 5%
ETHYL BENZENE	100-41-4	1 - 5%

N-HEXANE	110-54-3	1 - 5%
NAPHTHALENE	91-20-3	<1%
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1 - 5%
Toluene	108-88-3	5 - 10%
TRIMETHYL BENZENE	25551-13-7	1 - 5%
XYLENES	1330-20-7	5 - 10%

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

NOTE: The concentration of the components shown above may vary substantially. In certain countries, benzene content may be limited to lower levels. Oxygenates such as tertiary-amyl-methyl ether, ethanol, di-isopropyl ether, and ethyl-tertiary-butyl ether may be present. Because of volatility considerations, gasoline vapor may have concentrations of components very different from those of liquid gasoline. The major components of gasoline vapor are: butane, isobutane, pentane, and isopentane. The reportable component percentages, shown in the composition/information on ingredients section, are based on API's evaluation of a typical gasoline mixture.

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

Extremely flammable. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

POTENTIAL HEALTH EFFECTS

Irritating to skin. If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and lungs. May cause central nervous system depression. High-pressure injection under skin may cause serious damage. Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).

Target Organs: Lung | Skin |

ENVIRONMENTAL HAZARDS

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID:	Health:	1	Flammability:	3	Reactivity:	0
HMIS Hazard ID:	Health:	1*	Flammability:	3	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

Inhalation

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

Ingestion

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Benzene- Individuals with liver disease may be more susceptible to toxic effects.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Extremely Flammable. Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Sulfur Oxides, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: <-40C (-40F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6
Autoignition Temperature: >250°C (482°F)

SECTION 6 ACCIDENTAL RELEASE MEASURES

Notification Procedures

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the

applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces. Recover by pumping or with suitable absorbent.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid breathing mists or vapors. Avoid contact with skin. Use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Use proper bonding and/or grounding procedures. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put fuel into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapors and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices, etc.) in or around any fueling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source).

Static Accumulator: This material is a static accumulator.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. Keep container

closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be grounded and bonded. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Source	Form	Limit / Standard			NOTE	Source
BENZENE		OSHA Action level	0.5 ppm		N/A	OSHA Sp.Reg.
BENZENE		STEL	5 ppm		N/A	OSHA Sp.Reg.
BENZENE		TWA	1 ppm		N/A	OSHA Sp.Reg.
BENZENE		STEL	2.5 ppm		Skin	ACGIH
BENZENE		TWA	0.5 ppm		Skin	ACGIH
ETHYL ALCOHOL		TWA	1900 mg/m3	1000 ppm	N/A	OSHA Z1
ETHYL ALCOHOL		STEL	1000 ppm		N/A	ACGIH
ETHYL BENZENE		TWA	435 mg/m3	100 ppm	N/A	OSHA Z1
ETHYL BENZENE		STEL	125 ppm		N/A	ACGIH
ETHYL BENZENE		TWA	100 ppm		N/A	ACGIH
Gasoline		STEL	200 ppm		N/A	ExxonMobil
Gasoline		TWA	100 ppm		N/A	ExxonMobil
Gasoline		STEL	500 ppm		N/A	ACGIH
Gasoline		TWA	300 ppm		N/A	ACGIH
N-HEXANE		TWA	1800 mg/m3	500 ppm	N/A	OSHA Z1
N-HEXANE		TWA	50 ppm		Skin	ACGIH
NAPHTHALENE		TWA	50 mg/m3	10 ppm	N/A	OSHA Z1
NAPHTHALENE		STEL	15 ppm		Skin	ACGIH
NAPHTHALENE		TWA	10 ppm		Skin	ACGIH
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)		TWA	25 ppm		N/A	ACGIH
Toluene		Ceiling	300 ppm		N/A	OSHA Z2
Toluene		Maximum concentration	500 ppm		N/A	OSHA Z2
Toluene		TWA	200 ppm		N/A	OSHA Z2
Toluene		TWA	20 ppm		N/A	ACGIH
TRIMETHYL BENZENE		TWA	25 ppm		N/A	ACGIH
XYLENES		TWA	435 mg/m3	100 ppm	N/A	OSHA Z1
XYLENES		STEL	150 ppm		N/A	ACGIH
XYLENES		TWA	100 ppm		N/A	ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
Use explosion-proof ventilation equipment to stay below exposure limits.

Personal Protection

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:
No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
If prolonged or repeated contact is likely, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Liquid
Color: Clear (May Be Dyed)
Odor: Petroleum/Solvent
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.74
Flash Point [Method]: <-40C (-40F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 1.4 UEL: 7.6
Autoignition Temperature: >250°C (482°F)
Boiling Point / Range: > 20C (68F)
Vapor Density (Air = 1): 3 at 101 kPa
Vapor Pressure: > 26.6 kPa (200 mm Hg) at 20 C
Evaporation Rate (N-Butyl Acetate = 1): > 10
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): > 3
Solubility in Water: Negligible
Viscosity: <1 cSt (1 mm²/sec) at 40 C
Oxidizing Properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Halogens, Strong Acids, Alkalies, Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity (Rat): LC50 > 5000 mg/m³	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: No end point data.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. Based on assessment of the components.
Ingestion	
Toxicity (Rat): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity (Rabbit): LD50 > 2000 mg/kg	Minimally Toxic. Based on test data for structurally similar

	materials.
Irritation: No end point data.	Moderately irritating to skin with prolonged exposure. Based on test data for structurally similar materials.
Eye	
Irritation: Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Laboratory animal studies have shown that prolonged and repeated inhalation exposure to light hydrocarbon vapors in the same boiling range as this product can produce adverse kidney effects in male rats. However, these effects were not observed in similar studies with female rats, male and female mice, or in limited studies with other animal species. Additionally, in a number of human studies, there was no clinical evidence of such effects at normal occupational levels. In 1991, The U.S. EPA determined that the male rat kidney is not useful for assessing human risk.

Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Gasoline unleaded: Caused cancer in animal tests. Chronic inhalation studies resulted in liver tumors in female mice and kidney tumors in male rats. Neither result considered significant for human health risk assessment by the United States EPA and others. Did not cause mutations In Vitro or In Vivo. Negative in inhalation developmental studies and reproductive tox studies.Inhalation of high concentrations in animals resulted in reversible central nervous system depression, but no persistent toxic effect on the nervous system. Non-sensitizing in test animals. Caused nerve damage in humans from abusive use (sniffing).

Contains:

BENZENE: Caused cancer (leukemia), damage to the blood-producing system, and serious blood disorders from prolonged, high exposure based on human epidemiology studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus in laboratory animal studies.

ETHANOL: Prolonged or repeated exposure to high concentrations of ethanol vapor or overexposure by ingestion may produce adverse effects to brain, kidney, liver, and reproductive organs, birth defects in offspring, and developmental toxicity in offspring.

NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.

N-HEXANE: Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system (e.g. fingers, feet, arms, legs, etc.). Simultaneous exposure to Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown.

TOLUENE : Concentrated, prolonged or deliberate inhalation may cause brain and nervous system damage. Prolonged and repeated exposure of pregnant animals (> 1500 ppm) have been reported to cause adverse fetal developmental effects.

TRIMETHYLBENZENE: Long-term inhalation exposure of trimethylbenzene caused effects to the blood in laboratory animals.

ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

Additional information is available by request.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 3, 6
ETHYL BENZENE	100-41-4	5
Gasoline	86290-81-5	5
NAPHTHALENE	91-20-3	2, 5

--REGULATORY LISTS SEARCHED--

1 = NTP CARC
2 = NTP SUS
3 = IARC 1
4 = IARC 2A
5 = IARC 2B
6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.
Less volatile component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Majority of components -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

RCRA Information: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). Potential RCRA characteristics: IGNITABILITY. TCLP (BENZENE)

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT)

Proper Shipping Name: Gasoline
Hazard Class & Division: 3
ID Number: 1203
Packing Group: II
Marine Pollutant: MP: 100 %weight PP: 0 %weight
ERG Number: 128
Label(s): 3
Transport Document Name: UN1203, GASOLINE, 3, PG II, MARINE POLLUTANT

LAND (TDG)

Proper Shipping Name: Gasoline
Hazard Class & Division: 3
UN Number: 1203
Packing Group: II
Special Provisions: 17

SEA (IMDG)

Proper Shipping Name: MOTOR SPIRIT or GASOLINE or PETROL
Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1203
Packing Group: II
Marine Pollutant: Yes
Label(s): 3
Transport Document Name: UN1203, MOTOR SPIRIT or GASOLINE or PETROL, 3, PG II, (-40°C c.c.), MARINE POLLUTANT

AIR (IATA)

Proper Shipping Name: Gasoline
Hazard Class & Division: 3
UN Number: 1203
Packing Group: II
Label(s) / Mark(s): 3
Transport Document Name: UN1203, GASOLINE, 3, PG II

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, DSL, EINECS, ENCS, KECI, PICCS, TSCA

EPCRA: This material contains no extremely hazardous substances.

CERCLA: This material is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Contact local authorities to determine if other reporting requirements apply.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. Immediate Health. Delayed Health.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
ETHYL BENZENE	100-41-4	1 - 5%
N-HEXANE	110-54-3	1 - 5%
NAPHTHALENE	91-20-3	<1%
Toluene	108-88-3	5 - 10%
XYLENES	1330-20-7	5 - 10%
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1 - 5%
BENZENE	71-43-2	0.1 - 5%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
BENZENE	71-43-2	1, 2, 4, 10, 11, 13, 15, 16, 17, 18, 19
ETHYL ALCOHOL	64-17-5	1, 4, 13, 17, 18, 19
ETHYL BENZENE	100-41-4	1, 4, 10, 13, 16, 17, 18, 19
Gasoline	86290-81-5	1, 17, 18
N-HEXANE	110-54-3	1, 4, 13, 16, 17, 18, 19
NAPHTHALENE	91-20-3	1, 4, 5, 9, 10
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)	95-63-6	1, 13, 16, 17, 18, 19
Toluene	108-88-3	1, 4, 11, 13, 15, 16, 17, 18, 19
TRIMETHYL BENZENE	25551-13-7	1, 13, 16, 17, 18, 19
XYLENES	1330-20-7	1, 4, 5, 9, 13, 15, 17, 18, 19

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 04: First Aid Inhalation - Header was modified.
Section 04: First Aid Ingestion - Header was modified.
Section 06: Notification Procedures - Header was modified.
Section 01: Product Code was modified.
Section 10 Stability and Reactivity - Header was modified.
Section 13: Disposal Recommendations - Note was modified.
Section 09: Evaporation Rate - Header was modified.
Section 08: Personal Protection - Header was modified.
Section 08: Personal Protection was modified.
Section 11: Inhalation Lethality Test Data was modified.
Section 05: Hazardous Combustion Products was modified.
Section 09: Relative Density - Header was modified.
Section 09: Viscosity was modified.
Section 14: Transport Document Name was modified.
Section 14: Proper Shipping Name was modified.
Section 14: Label(s) - Header was modified.
Section 14: Proper Shipping Name was modified.
Section 14: Proper Shipping Name was modified.
Section 14: Transport Document Name was modified.
Composition: Component Table was modified.
Section 15: List Citations Table was modified.
Section 11: Tox List Cited Table was modified.
Section 15: List Citation Table - Header was modified.
Section 15: SARA (313) TOXIC RELEASE INVENTORY - Table was modified.
Section 16: Materials Covered was modified.
Composition: Component Table was modified.
Section 16: Precautions - Header was modified.
Section 16: NA Contains was modified.
Section 08: Exposure Limits Table was modified.
Section 08: OEL Table - Notation Column - Header was modified.
Section 08: Exposure Limit Values - Header was modified.
Section 14: Marine Pollutant - Header was added.
Section 14: Marine Pollutant was added.
Section 14: Marine Pollutant - Header was added.
Section 14: Marine Pollutant was added.
Section 08: Exposure limits/standards was deleted.
THIS MSDS COVERS THE FOLLOWING MATERIALS: ESSO EXTRA MIDGRADE UNLEADED | ESSO MIDGRADE UNLEADED | ESSO PREMIUM UNLEADED | ESSO REGULAR UNLEADED | ESSO SUPER PREMIUM UNLEADED | EXXON MIDGRADE UNLEADED | EXXON PREMIUM UNLEADED | EXXON REGULAR UNLEADED | Gasoline | INDOLENE GASOLINE | MIDGRADE UNLEADED | MOBIL EXTRA UNLEADED | MOBIL REGULAR UNLEADED | MOBIL SPECIAL UNLEADED | MOBIL SUPER UNLEADED | PREMIUM UNLEADED | REGULAR UNLEADED | UNLEADED GASOLINE

PRECAUTIONARY LABEL TEXT:
Contains: BENZENE, Gasoline
DANGER!
HEALTH HAZARDS
Irritating to skin. If swallowed, may be aspirated and cause lung damage. Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).
Target Organs: Lung | Skin |

PHYSICAL HAZARDS
Extremely flammable. Material can accumulate static charges which may cause an incendiary electrical discharge. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

Precautions
Avoid breathing mists or vapors. Avoid contact with skin. Use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Do not siphon by mouth. Use only with adequate ventilation. Use proper bonding and/or grounding procedures.

FIRST AID
Inhalation: Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Eye: Flush thoroughly with water. If irritation occurs, get medical assistance.

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Recover by pumping or with suitable absorbent.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. Seek the advice of a specialist before using dispersants.

This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm. Chemicals known to the State of California to cause cancer, birth defects, or other

reproductive harm are created by the combustion of this product.

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

Internal Use Only

MHC: 1A, 0, 0, 0, 3, 1 PPEC: CF

DGN: 2000316XUS (1011203)

Material Safety Data Sheet
Hydrochloric acid

MSDS# 94460

Section 1 - Chemical Product and Company Identification

MSDS Name:	Hydrochloric acid
Catalog Numbers:	SA5-5, SA50-1, SA50-20, SA50-4, SA52-20, SA52-500, SA54-1, SA54-10, SA54-20, SA54-4, SA60-1, SA62-1
Synonyms:	Chlorohydric acid; Hydrogen chloride; Muriatic acid; Spirits of salt; Hydrochloride.
Company Identification:	Fisher Scientific One Reagent Lane Fair Lawn, NJ 07410
For information in the US, call:	201-796-7100
Emergency Number US:	201-796-7100
CHEMTREC Phone Number, US:	800-424-9300

Section 2 - Composition, Information on Ingredients

Risk Phrases: 34 37

CAS#:	7647-01-0
Chemical Name:	Hydrochloric acid
%:	<2.0
EINECS#:	231-595-7
Hazard Symbols:	C

Risk Phrases:

CAS#:	7732-18-5
Chemical Name:	Water
%:	>98
EINECS#:	231-791-2
Hazard Symbols:	

Text for R-phrases: see Section 16

Hazard Symbols:	None listed
Risk Phrases:	None listed

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! May cause eye, skin, and respiratory tract irritation. Target Organs: No data found.

Potential Health Effects

Eye:	May cause eye irritation.
Skin:	May cause skin irritation.
Ingestion:	May cause irritation of the digestive tract.
Inhalation:	May cause respiratory tract irritation. Exposure to the mist and vapor may erode exposed teeth.
Chronic:	Prolonged or repeated skin contact may cause dermatitis. Repeated exposure may cause erosion of teeth. Repeated exposure to low concentrations of HCl vapor or mist may cause bleeding of nose and gums. Chronic bronchitis and gastritis have also been reported.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

Ingestion: If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Not flammable, but reacts with most metals to form flammable hydrogen gas. Use water spray to keep fire-exposed containers cool. Containers may explode when heated.

Extinguishing Media: Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Autoignition Temperature: Not applicable.

Flash Point: Not applicable.

Explosion Limits: Lower: Not available

Explosion Limits: Upper: Not available

NFPA Rating: health: 1; flammability: 0; instability: 1;

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation. Cover with dry earth, dry sand, or other non-combustible material followed with plastic sheet to minimize spreading and contact with water.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Discard contaminated shoes.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not store in metal containers. Store away from alkalies.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Hydrochloric acid	2 ppm Ceiling	50 ppm IDLH	5 ppm Ceiling; 7 mg/m3 Ceiling
Water	none listed	none listed	none listed

OSHA Vacated PELs: Hydrochloric acid: None listed Water: None listed

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:	Wear neoprene or polyvinyl chloride gloves to prevent exposure.
Clothing:	Wear appropriate protective clothing to prevent skin exposure.
Respirators:	A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State:	Clear liquid
Color:	colorless to slight yellow
Odor:	Not available
pH:	0.10 (1.0N soln)
Vapor Pressure:	Not available
Vapor Density:	Not available
Evaporation Rate:	Not available
Viscosity:	Not available
Boiling Point:	Not available
Freezing/Melting Point:	Not available
Decomposition Temperature:	Not available
Solubility in water:	Soluble
Specific Gravity/Density:	Not available.
Molecular Formula:	HCl
Molecular Weight:	36.46

Section 10 - Stability and Reactivity

Chemical Stability:	Stable under normal temperatures and pressures.
Conditions to Avoid:	Excess heat.
Incompatibilities with Other Materials	Bases.
Hazardous Decomposition Products	Hydrogen chloride.
Hazardous Polymerization	Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 7647-01-0: MW4025000 MW4031000
CAS# 7732-18-5: ZC0110000

LD50/LC50:

RTECS:
CAS# 7647-01-0: Inhalation, mouse: LC50 = 1108 ppm/1H;
Inhalation, mouse: LC50 = 20487 mg/m3/5M;
Inhalation, mouse: LC50 = 3940 mg/m3/30M;
Inhalation, mouse: LC50 = 8300 mg/m3/30M;
Inhalation, rat: LC50 = 3124 ppm/1H;
Inhalation, rat: LC50 = 60938 mg/m3/5M;
Inhalation, rat: LC50 = 7004 mg/m3/30M;
Inhalation, rat: LC50 = 45000 mg/m3/5M;
Inhalation, rat: LC50 = 8300 mg/m3/30M;
Oral, rabbit: LD50 = 900 mg/kg;
.
RTECS:
CAS# 7732-18-5: Oral, rat: LD50 = >90 mL/kg;
.

Carcinogenicity:

Hydrochloric acid - IARC: Group 3 (not classifiable)
Water - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Other: Rinsed with water test: Administration into the eye (rabbit) = 5 mg/30sec (Mild).

Section 12 - Ecological Information

Ecotoxicity:

Fish: Bluegill/Sunfish: 3.6 mg/L; 48 Hr; Lethal (unspecified)
Fish: Bluegill/Sunfish: LD50; 96 Hr; pH 3.0-3.5

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN Number: UN1789
Packing Group: II
Canada TDG
Shipping Name: Not regulated as a hazardous material
Hazard Class:
UN Number:
Packing Group:

USA RQ: CAS# 7647-01-0: 5000 lb final RQ; 2270 kg final RQ

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:Not available

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 7647-01-0: 1

CAS# 7732-18-5: Not available

Canada

CAS# 7647-01-0 is listed on Canada's DSL List

CAS# 7732-18-5 is listed on Canada's DSL List

Canadian WHMIS Classifications: Not controlled.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 7647-01-0 is listed on Canada's Ingredient Disclosure List

CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

US Federal

TSCA

CAS# 7647-01-0 is listed on the TSCA Inventory.

CAS# 7732-18-5 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 12/19/2007

Revision #2 Date 7/20/2009

MATERIAL SAFETY DATA SHEET
29 CFR 1910.1200 OSHA Hazard
Communication Rule Format
Chem-Tel 24 Hour Emergency # 1-800-255-3924

MINE SAFETY APPLIANCES COMPANY
P.O. Box 426
Pittsburgh, PA 15230
PHONE (412) 967-3000

This product contains isobutylene, oxygen and nitrogen, substances subject to the Pennsylvania Worker and Community Right-To-Know Act.

PRODUCT IDENTITY

LABEL IDENTITY - MSA P/N 10028038 Calibration Check Gas, 100 ppm Isobutylene in Air

CHEMICAL NAME - Isobutylene, Oxygen, Nitrogen Mixture

ADDITIONAL IDENTITIES - MSA P/N 10028038 Calibration Gas

FORMULA - C_4H_8 in Air

APPLICABLE CHEMICAL CONTENTS

	ppm	TWA
Isobutylene (CAS 115-11-7)	100	None
Air	Balance	None

NOTE: Gas under pressure, 1000 PSIG at 70°F, Approx. 100 Liters gas at atmospheric pressure

PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR - Colorless odorless gas.

BOILING POINT - N/A

SPECIFIC GRAVITY (H_2O = 1) - N/A

VAPOR PRESSURE - N/A

PERCENT VOLATILE BY VOLUME - N/A

VAPOR DENSITY (AIR = 1) - > 1

SOLUBILITY IN WATER - Isobutylene - Insoluble
Oxygen - 3.2 cm^3/100 ml (25°C)
Nitrogen - 2.3 cm^3/100 ml (0°C)

N/A - Not Applicable

PHYSICAL HAZARD INFORMATION

PHYSICAL HAZARD - Compressed gas, 1000 PSIG at 70°F

CONDITIONS OR MATERIALS TO AVOID - None

FLASH POINT - N/A LEL - N/A UEL - N/A

EXTINGUISHING MEDIA - This calibration gas mixture is not flammable. Use extinguishing media appropriate to surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES - See Next Item

UNUSUAL FIRE AND EXPLOSION HAZARDS - Gas under pressure, 1000 PSIG at 70°F. Do not exceed 120°F.

HEALTH HAZARDS

HEALTH HAZARDS - None Known for 100 ppm Isobutylene in Air. Isobutylene Inhalation Rat LC50: 620 Gm/M^3/4H. Isobutylene Inhalation Mouse LC50: 415 gm/M^3/2H.

SIGNS AND SYMPTOMS OF EXPOSURE - N/A to this gas mixture.

PRIMARY ROUTES OF ENTRY - Inhalation

TARGET ORGANS - Isobutylene is an asphyxiant, which displaces oxygen in the environment..

MEDICAL CONDITIONS GENERALLY RECOGNIZED AS BEING AGGRAVATED BY EXPOSURE - No information

EXPOSURE LIMITS - None (ACGIH 2009)

CARCINOGENICITY DATA - Component gases are not listed by NIOSH RTECS, OSHA, NTP or IARC.

EMERGENCY AND FIRST AID PROCEDURES - None

SAFE HANDLING AND USE

HYGIENIC PRACTICES - Avoid breathing gas.

PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT - N/A

PROCEDURES FOR SPILL OR LEAK CLEANUP - Ventilate area

WASTE DISPOSAL - Do not puncture or incinerate cylinder. Before discarding cylinder, slowly release contents to a safe exhaust. Dispose of cylinder in accordance with local, state and federal regulations

STORAGE - Store in a cool, dry, well-ventilated area. Do not exceed 120°F.

CONTROL MEASURES

PERSONAL PROTECTIVE EQUIPMENT - Due to the limited amount of gas in the cylinder, and the low release rate employed in instrument calibration, respiratory protection is not indicated under conditions of intended use.

ENGINEERING CONTROLS - Mechanical ventilation is suitable.

WORK PRACTICES - Avoid breathing gas. Use in well-ventilated areas. Follow the calibration procedure detailed in the MSA instruction manual provided with the instrument under calibration.

DATE OF PREPARATION - Rev. 2, April 2009

Material Safety Data Sheet

Version 3.0
Revision Date 05/12/2009
Print Date 06/23/2009

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Nitric acid

Product Number : 258121
Brand : Sigma-Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : HNO3

CAS-No.	EC-No.	Index-No.	Concentration
Nitric acid			
7697-37-2	231-714-2	007-004-00-1	>= 90 %
Water			
7732-18-5	231-791-2	-	<= 10 %

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Target Organ Effect, Corrosive

Target Organs

Lungs, Teeth., Cardiovascular system.

HMIS Classification
Health Hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

NFPA Rating
Health Hazard: 3
Fire: 0
Reactivity Hazard: 3
Special hazard.: OX

Potential Health Effects

Inhalation	May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin	May be harmful if absorbed through skin. Causes skin burns.
Eyes	Causes eye burns.
Ingestion	May be harmful if swallowed. Causes burns.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Continue rinsing eyes during transport to hospital.Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	no data available
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Do not let product enter drains.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling
Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Keep away from combustible material.

Storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Nitric acid	7697-37-2	TWA	2 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Eye & Upper Respiratory Tract irritation Dental erosion				
		STEL	4 ppm	2007-01-01	USA. ACGIH Threshold Limit Values (TLV)
	Eye & Upper Respiratory Tract irritation Dental erosion				
		TWA	2 ppm 5 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	4 ppm 10 mg/m3	1989-01-19	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	2 ppm 5 mg/m3	1997-08-04	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	The value in mg/m3 is approximate.				

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	colourless

Safety data

pH	< 1 at 20 °C (68 °F)
Melting point	no data available
Boiling point	100 °C (212 °F) at 1,013 hPa (760 mmHg)
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	11 hPa (8 mmHg) at 20 °C (68 °F)
Density	1.4 g/cm3
Water solubility	completely soluble

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions. Stable under recommended storage conditions.

Conditions to avoid
May discolor on exposure to air and light.

Materials to avoid
Alkali metals, Organic materials, Acetic anhydride, Acetonitrile, Alcohols, Acrylonitrile

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Acute toxicity

no data available

Irritation and corrosion

Skin - rabbit - Extremely corrosive and destructive to tissue. - Draize Test

Sensitisation

no data available

Chronic exposure

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as

a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Developmental Toxicity - rat - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Reproductive toxicity - rat - Oral
Effects on Newborn: Biochemical and metabolic.

Signs and Symptoms of Exposure

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Potential Health Effects

Inhalation	May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin	May be harmful if absorbed through skin. Causes skin burns.
Eyes	Causes eye burns.
Ingestion	May be harmful if swallowed. Causes burns.
Target Organs	Lungs, Teeth., Cardiovascular system.,

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish	LC50 - Asterias rubens - 100 - 330 mg/l - 48 h

Further information on ecology

May be harmful to aquatic organisms due to the shift of the pH.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2031 Class: 8 (5.1) Packing group: I
Proper shipping name: Nitric acid
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2031 Class: 8 (5.1) Packing group: I EMS-No: F-A, S-Q
Proper shipping name: NITRIC ACID
Marine pollutant: No

IATA
UN-Number: 2031 Class: 8 (5.1) Packing group: I
Proper shipping name: Nitric acid
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

OSHA Hazards
Target Organ Effect, Corrosive

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01

SARA 313 Components

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Nitric acid	7697-37-2	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Nitric acid	7697-37-2	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.0
Revision Date 07/02/2009
Print Date 08/06/2009

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Sulfuric acid

Product Number : 07208
Brand : Sigma-Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : H2SO4

CAS-No.	EC-No.	Index-No.	Concentration
Sulfuric acid			
7664-93-9	231-639-5	016-020-00-8	>= 95 - <= 97 %
Water			
7732-18-5	231-791-2	-	>= 3 - <= 5 %

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Target Organ Effect, Highly toxic by inhalation, Corrosive

Target Organs

Teeth., Lungs

HMIS Classification

Health Hazard: 4
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 3

NFPA Rating

Health Hazard: 3
Fire: 0
Reactivity Hazard: 0
Special hazard.: W

Potential Health Effects

Inhalation	May be fatal if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin	May be harmful if absorbed through skin. Causes skin burns.
Eyes	Causes eye burns.
Ingestion	May be harmful if swallowed. Causes burns.

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Continue rinsing eyes during transport to hospital.Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	not applicable
Ignition temperature	no data available

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Do not let product enter drains.

Methods for cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid inhalation of vapour or mist.
Normal measures for preventive fire protection.

Storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Sulfuric acid	7664-93-9	TWA	0.2 mg/m3	2004-01-01	USA. ACGIH Threshold Limit Values (TLV)
Remarks	Refers to Appendix A -- Carcinogens. ACGIH 2004 Adoption Sulfuric acid contained in strong inorganic acid mists Thoracic fraction				
		TWA	1 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 mg/m3	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Tightly fitting safety goggles. Faceshield (8-inch minimum).

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	clear, liquid
Colour	colourless

Safety data

pH	no data available
Melting point	no data available
Boiling point	no data available
Flash point	not applicable

Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Materials to avoid
Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, e.g. potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metals

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Sulphur oxides

Hazardous reactions
Reacts violently with water.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 2,140 mg/kg (Sulfuric acid)

LC50 Inhalation - rat - 2 h - 510 mg/m3(Sulfuric acid)

Irritation and corrosion

Skin - rabbit - Extremely corrosive and destructive to tissue. (Sulfuric acid)

Eyes - rabbit - Severe eye irritation (Sulfuric acid)

Sensitisation

no data available (Sulfuric acid)

Chronic exposure

The International Agency for Research on Cancer (IARC) has determined that occupational exposure to strong-inorganic-acid mists containing sulfuric acid is carcinogenic to humans (group 1). (Sulfuric acid)

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs and Symptoms of Exposure

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. (Sulfuric acid)

Potential Health Effects

Inhalation	May be fatal if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin	May be harmful if absorbed through skin. Causes skin burns.
Eyes	Causes eye burns.
Ingestion	May be harmful if swallowed. Causes burns.
Target Organs	Teeth., Lungs,

Additional Information
RTECS: WS5600000

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

Toxicity to fish	LC50 - Gambusia affinis (Mosquito fish) - 42 mg/l - 96 h (Sulfuric acid)

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1830 Class: 8 Packing group: II
Proper shipping name: Sulfuric acid
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 1830 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: SULPHURIC ACID
Marine pollutant: No

IATA
UN-Number: 1830 Class: 8 Packing group: II
Proper shipping name: Sulphuric acid

15. REGULATORY INFORMATION

OSHA Hazards
Target Organ Effect, Highly toxic by inhalation, Corrosive

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components

	CAS-No.	Revision Date
Sulfuric acid	7664-93-9	2007-03-01

SARA 313 Components

	CAS-No.	Revision Date
Sulfuric acid	7664-93-9	2007-03-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Sulfuric acid	7664-93-9	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Sulfuric acid	7664-93-9	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Sulfuric acid	7664-93-9	2007-03-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause cancer. Sulfuric acid	7664-93-9	2007-09-28

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.